

Tribhuvan University  
**Faculty of Management**  
**Office of the Dean**



**Course detail of  
BIM (Bachelor of Information Management) 1<sup>st</sup> Semester**

ENG 201: English Composition	3 Cr. hrs
MGT 201: Principles of Management	3 Cr. hrs
MTH 201: Basic Mathematics	3 Cr. hrs
IT 211: Computer Information System	3 Cr. hrs
IT 212: Digital Logic Design	3 Cr. hrs

**2013 (New Course)**

# ENG - 201 : English Composition

## **Module Objectives**

This course aims to develop students' skill in oral and written communication in English language.

## **Contents**

Intensive practice to improve listening comprehension for both daily and academic needs: the focus shall be on development of active listening habit and utilizing oral information in a variety of contexts. Grammatical and structural review of English: use of common structure in the English language, review of standard grammatical forms and their application in a variety of writing formats. Reading comprehension: development of reading comprehension proficiency from Information Technology related subject areas.

## **Detailed Course**

### **Unit 1:**

**LH 6**

Orientation on varieties of English, <Am E> and <Br E>+Spoken and written English, Formal and Informal English, Impersonal Style, Polite and Familiar language, Tactful and Tentative Literary, Rhetorical.

### **Unit 2:**

**LH 6**

Intonation: Stressed and Unstressed Syllables / words, Tone Unit, Falling Intonation, Rising and Fall-Rise Intonation.

### **Unit 3:**

**LH 8**

Concepts of Nouns – Countable / Mass, Group, Unit, Measure species, Abstraction, etc. (exercise work) Restrictive and Non-Restrictive meaning, Present Tense – State, Event, Habit, Progressive, Temporary habit. Past Tense and Future Tense. Time-when-adverb, Prepositional phrase, Noun phrase + ago, Adverbial Clause. Place – Adverb, Prepositional phrase, Noun Phrase + away, adverbial clause. Manner, Means Instrument, Role, Standard, Viewpoint, Conditional Sentences, Open and Hypothetical Conditions.

### **Unit 4:**

**LH 6**

Different types of Questions – Positive, Standard, Tag, Negative, WH-word, Polite, Short, Echo. Reported speech, Denial and Affirmation, Agreement and Disagreement. Neutrality, Hypothetical clauses, Putative 'should', Degree of likelihood.

### **Unit 5:**

**LH 6**

Interjections, Intensifying Adverbs, Negative Sentences, Exclamatory and Rhetorical Sentences. Emotions – Hope, Anticipation, Regret, Approval, Disapproval, Surprise, Concern and Volition. Permission and Obligation, Prohibition. Influencing People and Friendly Communication.

### **Unit 6:**

**LH 8**

Linking signals, Participle and Verbless clauses, Substitution and Omission. Main and Subsidiary Information, Fronted Topic, Inversion, Cleft Sentences, Postponement.

**Unit 7:****LH 20**

For essays and comprehension passages, the following passages have been prescribed for practice.

Essays and comprehension passages will be IT related.

- § Computers threatens marriage brokers. - LH 2
- § Computer virus hits Delhi varsity and Much Ado about nothing. - LH 2
- § Computers of the future. - LH 2
- § Employing computers. - LH 2
- § Science fiction. - LH 2
- § Computerization in India. - LH 2
- § Bio-gas plant. - LH 2
- § Mountaineering - LH 1
- § Chernobyl - LH 1
- § Who can you trust. - LH 1
- § Trekking - LH 1
- § Economic Impacts of Information Revolution. - LH 2

**Reference**

J.G. Leech, ***Communicative Grammar of English.***

# ITC – 211: Computers Information System (CIS)

## **Module Objectives**

This module aims to introduce students to the basics of computer and its use and application in real world situations. Students are expected to learn to use the MS Office for word processing, spreadsheet, graphic presentation, and Internet. Laboratory work is essential in this module.

## **Contents**

Introduction to computer system, Programming Language, Computer System development, Multimedia, Network and Communication, Introduction to the Internet, Data Processing and Database, Artificial Intelligence, Computer crime and safety measures.

## **Detailed Course**

### **Unit 1: Introduction to computer System**

**LH 13**

1. Introduction to computer
2. Characteristics of computer
  - a. Word Length
  - b. Speed
  - c. Storage
  - d. Accuracy
  - e. Diligence
3. Types Of computer
  - a. Laptop
  - b. Desktop
  - c. Palmtop
4. Use of Computer
5. Input output device
  - a. Input device
    - i. Keyboard and its use
    - ii. Mouse and its use
    - iii. Micro phone
  - b. Output Device
    - i. VDU
      1. CRT and its use
      2. LCD and its use
      3. Plasma and its use
    - ii. Printer
      1. Impact
        - a. Dot Matrix
      2. Non-Impact
        - a. Ink-jet printer
        - b. Laser Printer

- iii. Speakers
- 6. CPU(CU, ALU and Registers)
- 7. Bus and its type
- 8. Storage
  - a. Primary
    - i. Cache Memory
    - ii. RAM and its type
    - iii. ROM and its type
  - b. Auxiliary
    - i. Magnetic Tape
    - ii. Hard Disk
    - iii. Pen Drive
    - iv. Memory Card
    - v. Optical Disk
      - 1. CD
      - 2. DVD
      - 3. Magneto-optical (MO) drives
- 9. Software
  - a. Introduction
  - b. System Software
    - i. OS
      - 1. Introduction
      - 2. Features
    - ii. Utility Software
      - 1. Device Driver
      - 2. Anti virus
  - c. Application Software
    - i. Word Processer
    - ii. Spread Sheet
    - iii. Presentation Tool

## **Unit 2: Programming Language**

**LH 6**

- 1. Machine language and assembly language
- 2. High-level and low-level language
- 3. Assemblers, Compilers and Interpreter
- 4. Problem – Solving and programming
  - a. Algorithms
  - b. Flow Charts
  - c. Three Basic Operations (sequence, selection, iteration)
  - d. Procedures and programs
- 5. Structured Programming
  - a. Features
  - b. Advantages

6. OOPS
  - a. Features
  - b. Advantages
7. Scripting Language
  - a. Introduction
  - b. Client side scripting
  - c. Server side scripting

**Unit 3: Computer system Development**

**LH 4**

1. Investigation
2. Analysis
3. Design
4. Implementation
5. Documentation

**Unit 4: Multimedia**

**LH 2**

1. What is multimedia?
2. Uses of multimedia
3. Image Quality
4. Image File Format (TIF, JPEG, GIF)
5. Animation
6. Audio

**Unit 5: Network and Communication**

**LH 4**

1. Overview of Network
2. Types of Transmission (Data communication and voice communication)
3. Network topologies (Ring, Bus, Star)
4. Communication media
  - a) Guided
    - i) Twisted pair cable
    - ii) Coaxial cable
    - iii) Optical Fiber
  - b) Unguided
    - i) Microwave System
    - ii) Communication Satellites
5. Types of Network
  - a) LAN
  - b) WAN
6. Network Protocol
  - a) TCP/IP

**Unit 6: Introduction to the Internet**

**LH 4**

1. IP Address and Domain Name System (DNS)

2. Client-Server Architecture
3. Hyper Text Transfer Protocol (HTTP)
4. Electronic Mail (Email)
5. File Transfer Protocol (FTP)
6. World Wide Web (WWW)
7. Remote Login (TELNET)
8. Static and Dynamic web pages
9. Search Engines

**Unit 7: Data Processing and Database**

**LH 5**

1. Data Processing
  - a) Introduction to Data processing
  - b) File Processing
  - c) Sequential File processing
  - d) Direct-access file processing
2. Database
  - a) Introduction to database
  - b) E-R diagram (Symbols)
  - c) Relation Database
    - i) Primary Key
    - ii) Foreign Key
3. Data Mining
  - a) Introduction To data mining
  - b) Uses of Data Mining
4. Data warehouse
  - a) Introduction to data warehouse
  - b) Use of data warehouse

**Unit 8: Artificial Intelligence**

**LH 3**

1. Introduction
2. Application
3. Neural Networks
4. Genetic Algorithms
5. Expert System

**Unit 9: Computer Crime and Safety Measure**

**LH 4**

1. Computer Crime
2. Software Piracy
3. Anti Piracy
4. Computer Virus, Worm, Spyware
5. Ethical Issues in Computer
6. Cyber Law.
7. Network Security
  - a. Firewall

8. Data and message security
  - a. Encryption and Decryption

**References**

Introduction to Computers, Peter Norton's, Tata McGraw-Hill  
Data Mining, Pieter Adriaans, Dolf Zantinge, Pearson Education  
Foundations of IT----- Atul Kahate-----Tata mcGrawhill

# Digital Logic Design

## **Module Objectives**

The objective of this subject is to provide the foundation in the core fundamentals of digital technology. After completing this course students will be able to design simple digital devices and implement them. Laboratory work is essential in this module.

## **Contents**

Number System, Digital Design Fundamentals, Understand and Design Functions of Combinational Logic, Sequential Logic (Counters, Registers and Finite State Machine), Memories, Programmable Logic Devices, Integrated Circuit Technologies, VHDL language and Design using manual techniques and CAD tools.

## **Detailed Course**

### **Unit 1: Number Systems, Operations and Codes** **LH 5**

- a. Decimal, Binary, Octal, Hexadecimal Number Systems
- b. Conversion from one number system to another
- c. Complements of Binary Numbers
- d. Addition and Subtraction of Binary Numbers
- e. Digital Codes
- f. Error Detection Codes

### **Unit 2: Digital Design Fundamentals** **LH 8**

- a. Digital and Analog Quantities
- b. Binary Digits, Logic Operations, Logic Levels and Digital Waveforms
- c. Introduction to the System Concept
- d. Logic Gates (Basic Gates, Derived Gates, Universal Gates)
- e. Boolean Algebra and Logic Simplification
- f. Minimizing SOP and POS expression using K-Map (up to 4 variables only)

### **Unit 3: Functions of Combinational Logic** **LH 7**

- a. Adders and Subtractors
- b. Parallel Binary Adders
- c. Multiplexers and Demultiplexers
- d. Encoders and Decoders
- e. Seven segment decoder
- f. Code Converters

### **After Completion of Chapter 1, 2 and 3:**

Student should be able to design circuits like: Arithmetic Unit (Addition, Subtraction) circuit, number system converter circuits, various decision making circuits.

### **Unit 4: Latches and Flip- Flops** **LH 4**

- a. Latches
- b. Edge-Triggered Flip-Flops
- c. Flip-Flop Operating Characteristics
- d. Flip-Flop Application

- Unit 5: Counters** **LH 5**
- a. Asynchronous Counters
  - b. Synchronous Counters
  - c. Up/Down Counters
  - d. Cascaded Counters
  - e. Counter Applications

- Unit 6: Shift Registers** **LH 5**
- a. Basic Shift Register Operations
  - b. Shift Register Types
  - c. Bidirectional Shift Registers
  - d. Shift Register Counters

- Unit 7: Sequential Machine Design** **LH 6**
- a. State Diagrams and State Tables
  - b. Design of Synchronous Counters
  - c. Design of Sequence Recognizer(up to 5 bits)
  - d. Analysis of Synchronous Circuits

**After Completion of Chapter 4, 5, 6 and 7:**

Student should be able to design circuits like: digital clock, voting system, counting machine, storage device, traffic control system, frequency division circuits, and analyze circuits.

- Unit 8: Memories** **LH 1**
- a. Basic Memory Operations
  - b. Types of memories
    - i. RAM and ROM (no circuit details)

- Unit 9: Programmable Logic Devices** **LH 2**
- a. Introduction to various programmable devices
    - i. PLA
    - ii. PAL
    - iii. CPLD
    - iv. FPGA

- Unit 10: Integrated Circuit Technologies** **LH 2**
- a. Basic Operational Characteristics and Parameters
  - b. CMOS, TTL, ECL
  - c. Levels of Integration (SSI, MSI, LSI, VLSI, ULSI)

**After Completion of Chapter 8, 9 and 10:**

Student should be able to interface with various types of logic families and integrated circuits.

**Laboratory Works:**

VHDL language should be taught to specify the logic circuits. Instructor should illustrate how VHDL can be used to specify the desired functionality and how CAD tools (eg. Altera Quartus II) provide a mechanism for developing the required circuits. Instructor should assign design projects to each individual using both methodologies: manual design and CAD tools to design logic circuits.

**After Completion of Lab Works:**

Student can able to design circuits manually and using CAD tools.

**Course Book:**

- Floyd T. L., *Digital Fundamentals*, 10<sup>th</sup> edition, Pearson

**References:**

- Brown S. and Vranesic Z., ***Fundamentals of Digital Logic with VHDL Design***, 3<sup>rd</sup> edition, McGraw Hill
- Rafiquzzaman M., ***Fundamentals of Digital Logic and Microcomputer Design***, 5<sup>th</sup> edition, John Wiley & Sons, Inc.
- Holdsworth B. and Woods C., ***Digital Logic Design***, 4<sup>th</sup> edition
- Mano M.M, ***Digital Design***, 3<sup>rd</sup> edition
- Mano M. M, Kime C. R , ***Logic and computer design fundamentals***, 2<sup>nd</sup> edition

# MGT - 201 : Principles of Management

## **Course Objectives**

This module aims to impart the basic management knowledge, and skills to the students so as to enhance their managerial capabilities and enable them to apply in the practical field.

## **Contents**

Concepts and functions of management. Management perspective. Planning: meaning, classification, steps and tools. Planning premises. Decision making: meaning, types, conditions and process. Organizing: meaning, process, principles, and architecture. Authority and responsibility. Centralization, delegation and decentralization. Staffing. Emerging issues in organizing. Leading: meaning, qualities and styles. Individual differences and psychological contract. Introduction to groups. Concept of managerial ethics. Motivation: concept and techniques. Communication: meaning, process, types and barriers. Controlling: meaning, process and techniques. Quality. Organizational change and development and Operation and technology management. .

## **Detailed Course**

### **Unit 1: Introduction**

**LH 4**

Management: concepts, meaning, essence, levels and functions. Types of managers. Managerial roles and skills. Becoming a manager: role of education, experience and situation. Business environment and society-external environment, corporate social responsibility, ethics, corporate governance and ethical standards.

### **Unit 2: Perspectives in Management**

**LH 8**

Early development. Classical Perspective: scientific management, administrative management and bureaucracy. Behavioral Perspective: Hawthorne studies, human relations movement, and emergence of organizational behavior. Quantitative Perspective: management science and operations management. Integrating perspectives: systems and contingency perspectives. Emerging management issues and challenges.

### **Unit 3: Planning**

**LH 7**

Meaning. Levels of Planning: Strategic, Tactical and operational. Steps in Planning. Tools for planning. Planning premises. Pitfalls of planning. Improving planning. Decision Making: meaning, types and process. Decision making conditions – certainty, risk and uncertainty. Practical exercises on taking decisions including decision making using indicators.

### **Unit 4: Organizing**

**LH 8**

Meaning, process and principles of organizing. Organization Architecture: vertical differentiation – tall versus flat hierarchies, horizontal differentiation – functional structure, multidivisional structure, geographic structure, and matrix structure. Responsibility: establishing task and reporting relationships, creating accountability. Authority: line authority and staff authority. Delegation of

authority. Centralization, Decentralization and Devolution: meaning, reasons, advantages and disadvantages. Emerging issues in organization design. Staffing: concept and importance.

**Unit 5: Leading**

**LH 7**

Meaning and qualities of leadership. Understanding Individual differences and psychological contract. Concept and types of groups. Leadership Styles: autocratic, democratic, and participative. Concept of managerial ethics. Motivation: concept, importance, and techniques. Communication: meaning, process, and networks. Concept of active listening. Types of communication, Barriers to effective communication.

**Unit 6: Controlling**

**LH 10**

Meaning, purpose, Process and types of controls. Essentials of effective control systems. Control tools and techniques. Quality: Concept and importance. Total Quality Management: concept, components, principles, tools and techniques. Emerging issues in quality management. Production and operation management, supply chain management, Kaizen, six sigma, The Japanese 5S practice, Technology management, Management information system and IT.

**Unit 7: Organizational Change and Development**

**LH 4**

Nature, forces, paradigm shifts and areas (structure, technology, business process and behaviors) of organizational change. Resistance to change. Overcoming resistance to change. Concept of Organizational Development, OD intervention.

**Addendum:** At least one case will be administered at the end of each chapter. The students will also complete a project work and a few other assignments as specified by the faculty member.

**References**

Adhikari, Dev Raj. *Principles of Management*, Sunrise Publication, Kathmandu.

Charles W.L. Hill and Steven L. McShane, *Principles of Management*, Tata Mc-Graw-Hill Company, New Delhi.

Griffin, Ricky W., *Management*. AITBS Publishers and Distributors, New Delhi.

Hitt, M.A., J.S. Black and Porter, L.W., *Management*, Pearson Education, New Delhi.

Pant, Prem Raj, *Principles of Management*, Buddha Academic Publishers and Distributors Pvt. Ltd.

Paudyal, Santosh Raj, Pradhan, Gopal Man and Bhandari, Kedar P. (2064), *Principles of Management*, Asmita Publication, Kathmandu.

# MTH - 201 : Basic Mathematics

## **Module Objectives**

This module aims to provide the students with the basic mathematical skills required to understand management, IT and computing courses.

## **Course contents**

Numbers and their properties. Algebraic representation. Operations with rational expressions including polynomials. Algebraic and graphic methods for solving linear and quadratic equations. Introduction to complex numbers, exponents and radical expressions. Differential Equations. Concept of vectors and matrices.

## **Detailed Course**

### **Unit 1: Set Theory and Real Number System**

**LH 6**

Concept, notation and specification of sets, Types of sets, Relation between sets and their Venn diagrams, Operations on sets. Laws of algebra of sets (without proof), Number of elements in a set and the problems relating upto three sets.

Sets of numbers (Natural numbers, Integers, Rational numbers, Irrational numbers, Real numbers), Representation of real numbers on the real line. Properties (addition multiplication, cancellation, distributive, order) of real numbers (without proof), Inequalities and their properties. Intervals, Modulus of a real number and its properties.

### **Numerical Exercises.**

### **Unit 2: Complex Numbers**

**LH 4**

Definition of a complex number, Integral powers of  $i$ , Algebra of complex numbers (sum, difference, multiplication, division), Properties of complex numbers, Conjugate of a complex number and its properties, Modulus of a complex number and its properties, Representation of a complex number by a point in a plane (Argand's diagram), Polar representation of a complex number, Square roots of a complex number, DeMoivre's theorem (statement only) and its application to find upto cube roots of a complex number.

### **Numerical Exercises.**

### **Unit 3: Functions, Limits and Continuity**

**LH 6**

Constant and variable, Concept of functions, Types of functions, Graphic representation of algebraic, logarithmic and exponential functions, Computation of functional values, Domain and range of a function. Application of functions to business and economics.

Idea of a limit, Limit of a function at a particular point and at infinity, Properties of limits (without proof) and use in evaluating limits involving algebraic functions.

Concept of continuity and discontinuity, Test of continuity and discontinuity for simple algebraic functions.

## ***Numerical Exercises***

### **Unit 4: Differentiation and Its Application**

**LH 9**

Average rate of change, Definition of derivative, Derivative as a slope of tangent to the curve, Differentiation by the first principle of algebraic, logarithmic and exponential functions, Methods of differentiation (power rule, sum rule, product rule, quotient rule chain rule), Differentiation of implicit and parametric functions, Higher order derivatives (upto 3<sup>rd</sup> order).

### **Unit 5: Integration and Its Application**

**LH 6**

Concept of integration, Techniques of integration (Standard forms, Substitution method, Integration by parts), Integration of algebraic, logarithmic and exponential functions. Definite integral, Methods of evaluating definite integrals, Area under a curve, Application of integration in business and economics (including consumer's surplus and producers surplus).

## ***Numerical Exercises***

### **Unit 6: Differential Equations**

**LH 6**

Introduction: Differential equation: Ordinary differential equation, Order and degree of a differential equation, Solution of a differential equation, General and particular solutions.

Equations of the first order and first degree:

- a) variables separated from
- b) homogeneous equations
- c) linear equations

## ***Numerical Exercises (without involving trigonometric functions).***

### **Unit 7: Vectors**

**LH 5**

Definition of a vector in a plane and space, Directed line segment, Magnitude of a vector, Types of vectors, Multiplication of a vector by a scalar, Addition of vectors, Parallelogram law of addition of vectors, Collinear and coplanar vectors, Linearly dependent and independent vectors, Scalar product of two vectors, Orthogonal vectors, Vector product of two vectors.

## ***Numerical Exercises***

### **Unit 8: Matrices and Determinants**

**LH 8**

Introduction of matrices, Types of matrices, Equality of matrices, Algebra of matrices, Transpose of a matrix. Determinant of a matrix, Minors and cofactors of matrix, Properties of determinants (without proof) and some simple problems. Singular and non-singular matrix, Adjoint and inverse of matrices.

Solution of a system of non-homogeneous linear equations upto three variables (Cramer's rule, Inverse matrix method, Gaussian elimination method).

### **Unit 9: Transformation**

**LH**

2D/3D Transformations, Matrix Representation of Transformation, Successive and Composite Transformation

**References**

**Computer Graphics**, Hearn and Baker, Prentice Hill, 2<sup>nd</sup> Edition.

**Mathematics for Economics**, Taro Yamane, Prentice-Hall of India, New Delhi, 2<sup>nd</sup> Edition (An Elementary Survey)

**Calculus with Analytic Geometry**, George B. Thomas and Ross L Finney, Addison – Wesley, 9<sup>th</sup> Edition.

**Basic Mathematics** – B.C. Bajracharya, M.K. Publishers.

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**Course detail of**  
**BIM (Bachelor of Information Management) 2<sup>nd</sup> Semester**

**April 2014**

## BIM 2<sup>nd</sup> Semester Course Cycle

SOC 201: Sociology for Business	3 Cr. hrs
MTH 202: Discrete Mathematics and Its Application	3 Cr. hrs
MGT 204: Business Communication	3 Cr. hrs
IT 213: Structured Programming	3 Cr. hrs
IT 214: Data Communication and Computer Networks	3 Cr. hrs

# IT 213: Structured Programming

## Module Objectives

This module aims to introduce students to the discipline of computing with a focus on good program design, programming styles, and structured program development using a high-level programming language. The students shall also be introduced to the basic concepts in procedural abstraction, structured programming and top-down design with stepwise refinement. Laboratory work is essential in this module.

## Contents:

Introduction to the C Language, Data Types and Variables, Input/Output Management, Expressions and operators, Selection statements, Loops, Arrays, Modular Programming with Functions, Pointers and Strings, Structures and Dynamic Memory Allocation, The Preprocessor, and File Input/Output

## Detailed Course

### Introduction to the C Language [3hrs]

- ∅ The C Language and its Advantages
- ∅ The Structure of a C Program, Writing C Programs, Debugging a C Program
- ∅ Examining and Running a C Application Program

### Data Types and Variables [3hrs]

- ∅ Data Types (integer, floating, character, type conversion, type definitions, sizeof operator)

### Input/Output Management [3hrs]

- ∅ Input/Output Management: printf(), scanf()
- ∅ Conversion specifiers
- ∅ Escape sequences

### Expressions and operators [5hrs]

- ∅ Arithmetic operators: operator precedence and associativity
- ∅ Assignment operators
- ∅ Increment and decrement operators
- ∅ Expression evaluation
- ∅ Expression statements
- ∅ Relational operator, logical operator, arithmetic assignment,

## **Selection statements**

**[4hrs]**

- Ø Logical expressions
- Ø If statement
- Ø Switch statement

## **Loops**

**[4hrs]**

- Ø While
- Ø Do..while
- Ø For
- Ø Exiting from a loop (break, continue, goto)

## **Arrays**

**[3hrs]**

- Ø One-dimensional array
- Ø Multidimensional array

## **Modular Programming with Functions**

**[4hrs]**

- Ø Defining and calling functions
- Ø Function declarations
- Ø Arguments
- Ø Return statement
- Ø Program termination (exit function)

## **Pointers and Strings**

**[4hrs]**

- Ø Pointer variables
- Ø The address and indirection operators
- Ø Pointer assignment
- Ø Pointer as argument
- Ø Pointer as return values
- Ø Pointer Arithmetic
- Ø Using pointers for array processing
- Ø String literals, variables
- Ø Reading and writing strings
- Ø Using the C string library: strcpy, strlen, strcat, strcmp
- Ø Arrays of strings

## **Structures and Dynamic Memory Allocation**

**[4hrs]**

- Ø Structures, Arrays of Structures
- Ø Passing Structures to Functions
- Ø Nested Structures

- Ø Unions
- Ø enumerations
- Ø Dynamic Memory Allocation (malloc, calloc, realloc)
- Ø Deallocating storage
- Ø Linked list (-> operator, creating, displaying, searching)

### **The Preprocessor**

**[4hrs]**

- Ø How the preprocessor works
- Ø The C Preprocessor and the #include and #define Directives
- Ø Macro definitions (simple, parameterized macros), general properties of macros
- Ø #if and #endif directives
- Ø The defined operator

### **File Input/Output**

**[4hrs]**

- Ø Streams: file pointers, standard streams and redirection, text files versus binary files
- Ø File operations: opening a file, modes, closing a file, attaching a file to an open stream, obtaining file names from the command line
- Ø File Input and Output, reading/writing data, structure to files, random access

#### **Text Book:**

K. N. King, K.N. King, C Programming: A Modern Approach, W W Norton & Co Inc (February 1996)

Brian W. Kernighan, Dennis M. Ritchie ,C Programming Language, 2nd Edition Prentice Hall; 2 edition (April 1, 1988)

#### **Reference book:**

- David Griffiths, Dawn Griffiths, **Head First C**, O'Reilly Media; 1 edition (April 19, 2012)
- Clovis L. Tondo (Author), Scott E. Gimpel (Author), "The C Answer Book: Solutions to the Exercises in 'The C Programming Language,' Second Edition", Prentice Hall; 2nd edition (November 11, 1988)
- Peter van der Linden, Expert C Programming: Deep C Secrets, Prentice Hall; 1st edition (June 24, 1994)

# IT214: Data Communication & Computer Networks

## **Module Objectives**

The objective of this module is to provide a fundamental concept of the electrical characteristics of digital signals and the basic methods of data transmission, underlying principles in the design of a layered network architecture, identify the general characteristics of local area networks (LANs) and wide area networks (WANs), and concept of TCP/IP protocol stack as an example of a layered network architecture.

## **Contents**

Introduction to Data Communication, Data Communication principles, Overview of Digital Communication, Computer Communication Architecture, Data Link Layer, Medium Access (MAC) Sub-layer, Packet Switching, Routing Algorithms, The Network Layer in the Internet, Transport Layer, Application Layer and Other technologies overview

## **Detailed Course**

### **Unit 1: Introduction to Data Communication** **LH 2**

- 1.1 A basic Communication model
- 1.2 Data Communication Networking: WAN, MAN, LAN

### **Unit 2: Data Communication principles** **LH 4**

- 2.1 Basic Concept: Signal, Frequency, Amplitude, Bandwidth, Digital signal, Analog signals, Digital data and analog data, Transmission Impairments, Channel capacity, Overview of analog and digital transmission, Synchronous and asynchronous transmission
- 2.2 Data Encoding
  - 2.2.1 Digital data and digital signals- NRZ-L, NRZI, Manchester
  - 2.2.2 Digital data and analog signals- ASK, FSK, PSK, QPSK
- 2.3 Multiplexing Techniques ( FDM, TDM, WDM)

### **Unit 3: Overview of Digital Communication** **LH 3**

- 3.1 Media Concepts and classification of media
  - Guided Media (Twisted Pair, Coaxial cable, Fiber optics)
  - Unguided Media (description and working principle of VSAT and Satellite)
- 3.2 Transmission characteristics (Attenuation, Noise, Signal to Noise ratio, Propagation delay)

### **Unit 4: Computer Communication Architecture** **LH 3**

- 4.1 OSI (Open systems Interconnection) Reference Model
- 4.2 TCP/IP (Transmission Control Protocol/Internet Protocol) Protocol Suite

**Unit 5: Data Link Layer** **LH 5**

- 5.1 Service Provided to Network Layer
- 5.2 Framing
- 5.3 Error Detection methods: Parity, Checksum , CRC
- 5.4 Data Link Protocols
  - 5.4.1 A simplex stop and wait protocol
  - 5.4.2 Sliding window protocols
    - 5.4.2.1 A One Bit Sliding Window Protocol
    - 5.4.2.2 A Protocol Using Go Back N
    - 5.4.2.3 A Protocol Using Selective Repeat

**Unit 6: Medium Access (MAC) Sub-layer** **LH 4**

- 6.1 Multiple access Protocols
  - 6.1.1 ALOHA (Pure and Slotted ALOHA)
  - 6.1.2 Carrier Sense Multiple Access(CSMA)
    - 6.1.2.1 CSMA/CD
    - 6.1.2.2 CSMA/CA
- 6.2 Topologies
- 6.3 Overview of IEEE Standard 802 for LANS and MANS
  - 6.3.1 Brief introduction Ethernet
  - 6.3.2 Brief introduction Token Ring
- 6.4 Introduction to Wireless Communication
- 6.5 Introduction to Bridge, Switch and Router

**Unit 7: Packet Switching** **LH 2**

- 7.1 Packet Switching Principles
- 7.2 Switching Techniques
  - 7.2.1 Datagram Approach
  - 7.2.2 Virtual Circuit Approach

**Unit 8: Routing Algorithms** **LH 4**

- 8.1 Fixed Path Routing
- 8.2 Shortest Path Routing
- 8.3 Flooding
- 8.4 Distance Vector Routing
- 8.5 Link State Routing

**Unit 9: The Network Layer in the Internet** **LH 7**

- 9.1 IP Protocol IP V4
- 9.2 IP Addresses
- 9.3 Subnets
- 9.4 Supernet
- 9.5 VLSM(variable length subnet masking), CIDR(Classless Inter-Domain Routing) and NAT (Network Address Translator)
- 9.6 Overview of Internet Control Protocols
  - 9.6.1 ICMP,IGMP
- 9.7 Routing Protocols
  - 9.7.1 Interior Routing Protocol: OSPF
  - 9.7.2 Exterior Routing Protocol: BGP
- 9.8 Introduction to IPv6

**Unit 10: Transport Layer LH 4**

- 10.1Transport Services
- 10.2Addressing
- 10.3Internet Transport Protocols TCP (Transmission Control Protocol) and UDP (User Datagram Protocol)
  - Introduction to UDP (Operation of UDP, Characteristics of UDP, Application of UDP)
  - Introduction to TCP (Operation of TCP, Characteristics of TCP, TCP three-way handshake process, Application of TCP)
  - Relationship between TCP & IP
  - Standard TCP / IP services
  - Port numbers and socket address
- 10.4Overview of BSD Socket API

**Unit 11: Application Layer**

**LH 3**

- 11.1. DNS (ARP and RARP), Mail protocol (SMTP, POP, IMAP), DHCP, Web services (WWW, HTTP, HTTPS, FTP), telnet, DHCP.
- 11.2. Client server and P2P application
- 11.3. Relation between Application layer and Transport layer.

**Unit 12: Other technologies overview**

**LH 3**

PSTN, ISDN and its type, Frame relay, DSL and ADSL, VoIP, Bluetooth, Wi-Fi, Overview of GSM, Wi-Max, 3G and 4G(LTE), Near field Communication(NFC).

v Lab Work

- o Lab 1, 2, 3, 4:- Cabling (straight cable, Cross cable) and Installation of client and server OS. Connecting the computers in Local Area Network with guided media/unguided media and Working with basic network commands.

- Lab 5, 6:- Sharing Resources such as file, printer, internet, hardware, and disk in peer to peer model
  - Lab 7, 8:- Configuring server and Sharing Resources such as file, printer, internet, hardware, and disk.
  - Lab 9, 10:- Creating Network user, setting up permissions, setting up fileserver.
  - Lab 11:-Installing and configuring DNS
  - Lab 12:- Installing and configuring DHCP
  - Lab 13:- Installing and configuring web server
  - Lab 14:- Setting Up wireless devices and access points.
  - Lab 15:- Securing Wireless devices.
- v Project Work: The instructor should assign a project to the students on focusing the designs of a small LAN.
  - v Field work, seminar/ presentation are essential in this subject.

***Text Book***

Behrouz A. Forouzan, Data Communications and Networking, 5<sup>th</sup> edition, McGraw-Hill

***References***

A.S Tanenbaum, Computer Networks. 4<sup>th</sup> Edition. PHI.

D.E. Corner, Internetworking with TCP/IP. Vol.1. 3<sup>rd</sup> ed. PHI.

S. Keshav, An Engineering Approach to Computer Networking Addison Wesley, Longman.

W. Stalling, Data and Computer Communications. 8<sup>th</sup> Edition. PHI.

W.R. Stevens, TCP/IP Illustrated Volume I, II and III, Addison Wesley Longman

Behrouz A. Forouzan, Firouz Mosharraf, Computer Networks: A Top-Down Approach, McGraw-Hill

## MGT 204: Business Communication

### ***Module Objectives***

This course aims to develop students' skill in presenting effective oral and written communication in English language with a focus on presenting seminars, writing papers and reports, business correspondence and so on.

### ***Contents***

Communication in business: communication process and malfunctions. Essentials of business communication: shorter structured units, effective organization, unity, coherence, and standard grammatical forms. Written communication: business correspondence formats, terms papers, project reports and research reports. Oral communication: formal and informal oral communication, group discussions, seminar presentations, gestures and body language.

### ***Detailed Course***

<b>Unit1: Communication Theory</b>	<b>LH 16</b>
§ Role of communication in business	
§ Model of the communication process	
§ Perception and reality	
§ Filter of the mind	
§ Words and meaning	
§ Some main functions of communication	
<b>Unit 2: Fundamentals of Business Writing</b>	<b>LH 6</b>
§ Principles of clear business writing	
§ Qualities of effective correspondence	
<b>Unit 3: Business Correspondence</b>	<b>LH 6</b>
§ Sales and application	
§ Memorandum	
<b>Unit 4: Business Report writing</b>	<b>LH 6</b>
§ Reports: Problems, Organization and Interpretations	

§ Reports: Determination and make-up

**Unit 5: Other forms of Business Communication**

**LH 8**

§ Public speaking and oral reporting

§ Other oral communication activities

§ Nonverbal communication

**Presentations and Project works**

**LH 3**

***Reference***

Lesikar and Pettit (Sixth Edition) A-I-T-B-S. Publishers and Distribution 1999.

# MTH 202 Discrete Mathematics and Its Applications

## **Module Objectives:**

To understand the concepts: Mathematical Reasoning, Combinatorial Analysis, Discrete Structures, Algorithmic Thinking, and Applications.

## **Contents:**

Logic and Proof, Algorithms, the Integers, Mathematical Reasoning, Induction, and Recursion, Counting, Relations and functions, Graphs, Trees.

## **Detailed Course**

### **1 The Foundations: Logic and Proof,**

#### 1.1 Logic

- Propositions, Proposition variables, Truth table, conjunction, disjunction, Exclusive, implications, converse, inverse, Contra positive, Bi-conditional, Tautology, Contradiction, translating English sentences, logic and bit operations

#### 1.2 Propositional Equivalences

- Introduction, Logical equivalences: Identity law, Domination law, Idempotent laws, Double negation law, commutative law, associative law, Distributive law, De-Morgan's law, Absorption law, Negation law (Verification)

#### 1.3 Brief introduction and examples of Predicates and Quantifiers

#### 1.4 Methods of Proof

Methods of proving theorems (direct proofs, indirect proofs, vacuous and trivial proofs, proof by contradiction).

### **2 The Fundamentals: Algorithms, the Integers, and Matrices**

#### 2.1 Algorithms

Introduction, searching algorithms (linear, binary), sorting (bubble, insertion), greedy algorithms, halting problem

#### 2.2 The Growth of Functions

Introduction, big-O notation, the growth of combinations of functions, big-omega and big-theta notation

#### 2.3 Complexity of Algorithms

Introduction, time complexity, worst case complexity, average case complexity, understanding the complexity of algorithms

#### 2.4 The Integers and Division

Introduction, division, primes, the fundamental theorem of arithmetic, the infinitude of primes, the division algorithm, GCD and LCM, modular arithmetic, applications of congruence's, Cryptology.

### 3. **Mathematical Reasoning, Induction, and Recursion**

#### 3.1 Sequences and Summations

Introduction, sequences, recurrence relations, special integer sequences, summations

#### 3.2 Mathematical Induction

Introduction, mathematical induction, Recursive Definitions.

Introduction, recursively defined function,

#### 3.3 Recursive Algorithms, recursion and iteration, the merge sort

### 4. **Counting**

4.1 Basic counting principle – The sum rule and the product rule.

4.2 Permutation of  $n$  different objects, The number of  $r$  – permutations of  $n$  distinct objects when (a) repetition of objects are not allowed (b) repetition of objects are allowed.

Permutations of  $n$  objects when the things are not distinct, circular permutations.

Restricted permutations – The number of  $r$ -permutations of  $n$  different objects in which (i)  $k$  particular objects do not occur and (ii)  $k$  particular objects are always present.

4.3 Combination: -  $r$ -combinations of  $n$  different objects Restricted combinations, combinations with repetitions: the number of combinations of  $n$  objects taken  $r$  at a time with repetition is  $c(n+r-1, r)$

4.4 Binomial Theorem, Binomial coefficients and Pascal triangle Pascal's identity.

4.5 The pigeonhole principle and Inclusion and Exclusion principle.

4.6 Recurrence relation and solving it.

### 5. **Relations and Functions**

5.1 Product sets, Binary relations, Domain and Range of binary relation.

5.2 Types of relations – Inverse relation, Identity relation, universe relations, void relation, complementary relation, ternary relation and  $n$ -ary relation.

5.3 Representation of relations – Table of relation, Arrow diagrams of relation, Graph of relation, Matrix of relation, Directed graph of a relation on a set  $A$ .

5.4 Boolean matrix, Boolean matrix operation, Boolean product of two matrices, complement of Boolean matrix.

5.5 Properties of relations – reflexive, irreflexive, symmetric, asymmetric, anti-symmetric and transitive relations. Equivalence relation, Equivalence relation and partition, Equivalence classes and quotient set. Partial order relation, Partial ordered set

5.6 Composition of two relations, matrix of composition relations properties –

a) If  $R$  is a relation from  $A$  to  $B$  and  $S$  a relation from  $B$  to  $C$ , then  $M_{S \circ R} = M_R \times M_S$ . (*without proof*)

b) If  $R$  is a relation from  $A$  to  $B$ ,  $S$  a relation from  $B$  to  $C$ , and  $T$  a relation from  $C$  to  $D$ , then  $T \circ (S \circ R) = (T \circ S) \circ R$ . (*without proof*)

c) Let A, B and C be sets, R a relation from A to B, and S a relation from B to C. Then  $(S \circ R)^{-1} = R^{-1} \circ S^{-1}$  (without proof)

5.7 Concept of function, Domain and Range, image and pre-image, Graph of a function  $f: A \rightarrow B$ , Equality of functions, Real valued function, constant function and Identity function. Special functions – Floor function, ceiling function

5.8 Types of functions – onto function, one-to-one function, one-to-one correspondence between A and B, Inverse function.

5.9 The composition of two functions, Properties – (a)  $I_B \circ f = f$ , (b)  $f \circ I_A = f$ , (c)  $f^{-1} \circ f = I_A$ , (d)  $f \circ f^{-1} = I_B$ , (with proof), (f)  $(g \circ f)^{-1} = f^{-1} \circ g^{-1}$ .

## 6. Graphs

6.1 Introduction to Graphs and graph terminologies:

Simple graph, multiple graph and pseudo graph, order of a graph and size of a graph adjacent vertices, adjacent edges, degree of a vertex, isolated vertex and Pendant vertex. Degree sequence of a graph.

**Properties (with proofs):**

- The sum of the degree of the vertices of a graph is equal to twice the number of edges.
- The number of odd vertices in a graph is always even.

Special types of simple graph – Isolated graph, complete graph, Regular graph, Path graph, Cycle graph, Wheel graph, Bipartite graph and complete bipartite graph, Graphs of regular Platonic Solids.

Properties (with proofs):-

- The total number of edges in a complete graph  $K_n$  is  $\frac{n(n-1)}{2}$
- The number of vertices in a r-regular graph is even if r is odd.
- The complete graph  $K_n$  is the regular graph of degree  $n - 1$ .
- In the cyclic graph  $C_n$ , size of  $C_n$  is equal to order of  $C_n$ .
- The size of wheel  $W_n$  is twice the size of  $C_n$ .
- The sum of the degrees of vertices in  $W_n$  is four times the size of  $C_n$ .
- Size of the complete bipartite graph  $K_{m,n}$  is  $m \times n$  and order is  $m + n$ .

6.2 Representing Graphs: Adjacency list, Adjacency matrix, and Incidence matrix.

6.3 Isomorphism of Graph: Isomorphic graphs, Isomorphism classes, Self Complementary.

6.4 Connectivity: walk, trail and circuit, Path and Cycle, Connected graph, Cut-sets and Cut-vertices. Edge connectivity and vertex connectivity.

6.5 Euler and Hamilton Paths:

Eulerian trail, Eulerian Circuit, Eulerian graph, Konigsberg Bridge problem. Theorems (without proofs):- a. A connected graph G has Eulerian trail if and only if it has exactly two odd vertices.

b. A connected graph G has Eulerian circuit if and only if it has no odd vertices.

path, Hamiltonian cycle and Hamiltonian graph.

Theorems (*without proofs*)

- a) (Ore's) A connected graph with  $n$  vertices is Hamiltonian if for any two non-adjacent vertices  $u$  and  $v$ ,  $\deg(u) + \deg(v) \geq n$ .
- b) (Dirac) A connected graph with  $n (> 2)$  vertices is Hamiltonian if degree of every vertex is at least  $n/2$ .

Labeled graphs and weighted graphs,

6.6 Shortest-Path Problems: – Dijkstra's algorithm

6.7 Digraph, Simple digraph, Reflexive, Symmetric and Transitive digraph, Loop and parallel arc (edge), adjacent vertices and degree of vertices, Source vertex and Sink vertex.

Theorem (without proof) – In a digraph, the sum of the in-degrees of vertices, the sum of the out-degrees of vertices and the number of edges are equal to each other.

6.8 Representation of digraph - Adjacency list, Adjacency matrix and Incidence matrix.

6.9 Connectivity of digraphs – underlying graph, directed walk, closed walk, directed path, directed cycle, spanning path. Weakly connected, unilaterally connected and strongly connected theorems (*without proofs*):

- a) A digraph  $D$  is unilaterally connected if it has a spanning path in  $D$ .
- b) A digraph  $D$  is strongly connected if it has a closed spanning path in  $D$ .

## 7. Trees

7.1 Introduction, rooted tree, non-rooted tree, root vertex, Terminal vertex, Internal vertex, Level of a vertex, Height of a tree.

7.2 Properties of tree (*with proofs*).

- a) Let  $G(V, E)$  be a loop-free undirected graph. Then  $G$  is a tree if there is a unique path between any two vertices of  $G$ .
- b) A tree with  $n$  vertices has exactly  $n - 1$  edges.
- c) In any tree  $G$ , there are at least two pendant vertices.
- d) A forest  $G$  with  $n$  vertices has  $n - k$  edges, where  $k$  is the number of components of  $G$ .

7.3 Spanning tree and Methods of constructing a spanning tree from a graph by

- a) Breadth – first search and
- b) Depth – first search (Backtracking), Determination of the number of spanning trees.

7.4 Minimum spanning tree – a) Kruskal algorithm b) Prim's algorithm.

7.5 Tree Traversal: In order, Pre-order, and post order traversal

7.6 Applications of Trees: Binary expression tree

7.7 Full binary tree and its properties:

- a) The number of vertices  $n$  in a binary tree is always odd.
- b) The number of pendant vertices of a binary tree with  $n$  vertices is  $\frac{1}{2}(n + 1)$ .
- c) The number of internal vertices in a binary tree is one less than the number of pendant vertices.

- d) The maximum number of vertices possible in K-level binary tree is  $2^0 + 2^1 + 2^2 + \dots + 2^K \geq n$ .
- e) The minimum possible height of an n-vertex binary tree is  $\min L_{\max} = \lceil \log_2 (n + 1) - 1 \rceil$ , where  $L_{\max} = \max^m$  level of any vertex.
- f) The maximum possible height of an n – vertex binary tree is  $\max L_{\max} = \frac{(n - 1)}{2}$

**Lecture: 48 Hours**

**Tutorial: 12 Hours**

**Text Book**

Rosen K.H., *Discrete Mathematics and its applications, 5<sup>th</sup> Edition*, McGraw Hill Companies

**References**

Kolma, Busby, Ross; *Discrete Mathematical Structures*, Prentice – Hall of India.

R. Joshnsonbaugh; *Discrete Mathematics*, Pearson Education Asia.

Seymour Lipschutz and Marc Lipson; *Discrete Mathematics*, (Schaum's Outline).

S.M. Maskey: *First course in Graph Theory*, Published by Ratna Pustak Bhandar.

E. G. Gooduire and M. M. Paramenter, *Discrete mathematics with graph theory*, Prentice – Hall of India.

Narsingh Deo: *Graph Theory (with application to engineering and computer science)*, Prentice – Hall of India Pvt. Ltd.

# SOC 201: Sociology for Business

## Module Objectives

This module aims to inculcate knowledge of basic sociological concepts and methods so that students are equipped with an adequate understanding of the sociological perspectives on management and business administration.

## Contents

Introduction to Sociology, Basic concepts in Sociology; Social Institutions: Social Processes; Social Stratification; Social Disorder, Deviance and Social Control; Social Change; Theoretical Perspectives in Sociology; Research Methods in Sociology and; The Sociological perspectives on Management and Business Administration.

## Detailed Course

### Unit 1: Introduction to Sociology LH 4

- § Meaning, nature, subject matter and emergence of sociology.
- § Relationship of sociology with economics, psychology and anthropology.
- § Relevance of sociology in management and business administration.

### Unit 2: Basic Concepts in Sociology LH 4

- § Meaning and definition of society, community, culture, group, norms, values, status, role, ethnicity, gender, class and caste.
- § Implication of sociological concepts in management and business administration related issues/problems.

### Unit 3: Social Institutions LH 4

- § Meaning and definition, and basic features of family, kinship, economy, polity, education and religion.
- § Linkage of social institutions with management and business administration related issues/problems.

### Unit 4: Social Processes LH 4

- § Meaning and definition of socialization, adaptation, cooperation, competition, conflict, globalization.
- § Implications of social processes in management and business administration.

### Unit 5: Social Stratification LH 5

- § Meaning and definition of social differences, inequalities and stratification
- § Caste, class, ethnicity and gender dimensions of social stratification in Nepal
- § Social stratification vis-à-vis management and business administration

**Unit 6: Social Disorder, Deviance and Social Control** **LH 2**

- § Meaning and definition of social problems (disorder and deviance) and social control.
- § Linkage with management and business administration.

**Unit 7: Social Change** **LH 4**

- § Meaning and definition of social and cultural change.
- § Factors of social and cultural change.
- § Connection of management and business administration to social and cultural change.

**Unit 8: Theoretical Perspectives in Sociology** **LH 6**

- § The sociological imagination and sociological perspectives.
- § Functionalism: basic assumptions.
- § Conflict Theory: basic assumptions.
- § Postmodernism: basic assumptions.
- § Implications of sociological theories in management / business administration.

**Unit 9: Research Methods in Sociology** **LH 5**

- § Nature and trend of sociological research
- § Choosing a research problem or a topic
- § Formulating hypothesis or assumptions
- § Designing a research or writing a research proposal
- § Collecting / acquiring data through fieldwork
- § Processing, analyzing and interpreting data / findings
- § Writing up the report and Presenting / disseminating the findings

**Unit 10: The Sociology of Management and Business Administration** **LH 10**

- § Sociology of organizations
- § Networks and organizations
- § Analysis of organization
- § Organizational / bureaucratic goals and societal expectations
- § Managers and corporations vis-à-vis politics and power
- § Work and leisure
- § Group dynamics and intergroup relations
- § Indigenous management and management of indigenous knowledge
- § Dynamics of social capital
- § Interdependence of social and technical skills

- § Market and political culture
- § Management of non-government development organizations
- § Social movement politics and organization
- § Relations in Business

**Project Work (Specify the hours allocated to Unit 10)**

- § Choosing a topic for research
- § Preparing research plan / proposal and developing research tools
- § Conducting fieldwork / research
- § Writing report and presentation

**Addendum:** At least one case will be administered in the end of each chapter. The students will also complete a project work and few other assignments as specified by the faculty member.

**References**

- Abraham, M. Francis, 1982, *Modern Sociological Theory: An Introduction*, Calcutta: Oxford University Press, pp. 72-113, 209-242.
- Chaturvedi, A. and A. Chaturvedi 1995, The Rationale of a Sociology of Organizations: Introduction, In *The Sociology of Formal Organizations*, Delhi: Oxford University press, pp. 1-40.
- Fligstein, N. 2002, Markets as Politics: A Political – Cultural Approach to market Institutions. In *Readings in Economic Sociology*, London: Blackwell.
- Haralambos, M. and RN Heald 1980, *Sociology: Themes and Perspectives*, New Delhi: Oxford University Press, pp 228-324.
- Lewis, D. 1999, *The Management of Non-governmental Development Organizations*,
- Shankar Rao, C.N. 2000, *Sociology: Primary Principles*, Third Edition, New Delhi: S Chand and Company.
- Turner, J.H. 1994, *Sociology: Concepts and Uses*, New York: McGraw-Hill, Inc. pp. 139-172.
- Vidyabhusan and DR Sachadeva, 1983, *An Introduction to Sociology*, New Delhi: Kitav Mahal.

# ACC 201: Financial Accounting

*Credit Hours: 3*  
*Lecture Hours: 48*

## **Module Objectives:**

This module aims to familiarize students with the function and process of financial reporting system from a user and system designer perspective.

## **Course Description:**

Introduction to financial accounting: concept, objectives, and accounting principles. The accounting process: double entry book-keeping, accounting equation, accounting cycle, rules of debit and credit, journalizing the transactions, posting and closing the ledgers, subdivision of journals, cash and banking transactions, bank reconciliation, preparation of trial balance and adjustment entries. Accounting for receivables: concept, types of account receivables, and financial statement presentation of receivables, managing receivables. Accounting for long-lived assets: types, determining the cost of plant, accounting for plant, analyzing plant assets. Intangible assets: accounting for intangible assets, types, financial statement presentation of long-lived assets. Reserve and provisions: concept, types, capital profit and revenue profit. Financial statement and closing entries: preparation of income and retained earnings statements, closing entries, preparation of balance sheet with adjustments and cash flow statement.

## **Course Details**

### **Unit 1: Introduction**

**LH6**

- Meaning of accounting
- Objective, importance and functions of accounting
- Accounting information and economic decisions
- Users of accounting information
- Basic terminologies: Capital, Liabilities: long term and short term, assets: fixed assets, intangible assets, and current assets, purchases, sales, debtors, creditors, inventories, revenues and expenses.

### **Unit 2: General Accepted Accounting Principles (GAAP)**

**LH2**

- Business entity concept
- Money measurement concept
- Going concern concept
- Cost concept
- Accounting period concept
- Realization concept
- Matching concept

### **Unit 3: Double Entry System**

**LH3**

- Concept, Features, Advantages of Double entry book-keeping system
- Accounting Equation
- Accounting Cycle/Process

**Unit 4: Recording of Business Transactions** **LH5**

- Types of Accounts, Rules for Debit and Credit
- Meaning and objectives of Journal, Journalizing based on types of account and on
- Ledger: Meaning, Objectives, Account formats (T format and balancing format). Posting accounting equation: Simple and Compound entries including bills of exchange into ledger, Balancing and closing of ledger accounts

**Unit 5: Sub-division of Journal** **LH5**

- Sales Book: Concept, Trade discount and cash discount application and treatment,
- Purchase Book: Concept, Preparation and Posting from Purchase Book
- Sales Return Book: Concept, Credit Note, Preparation and Posting from Sales Return
- Preparation and Posting from Sales Book
- Purchase Return Book: Concept, Debit Note, Preparation and Posting from Purchase
- Bills Payable Book: Concept, Preparation and Posting from Bills Payable Book
- Bills Receivable Book: Concept, Preparation and Posting from Bills Receivable Book

**Unit 6: Accounting for Cash and Banking Transactions** **LH8**

- Cash and Banking Transactions: Objectives, importance. Bank account: Current account,
- Cheques: Meaning, Parties to a cheque, Types, Rules for drawing a cheque, Issue,
- Pass Book: Concept and importance
- Cash Book: Concept and importance. Types of Cash Book: Single, Double and Triple
- Bank Reconciliation Statement: Concept, Importance, Reasons for disagreement between cash book and pass book .
- Saving account. Fixed deposit account Deposit, Endorsement and Dishonor of Cheque Column Cash Book, Petty Cash Book: Meaning, Importance, Types cash book and pass book balances, and preparation of Bank Reconciliation Statement

**Unit 7: Trial Balance** **LH4**

- Meaning and Objectives, Preparation of Trial Balance, Adjusted trial balance
- Journal Proper: Concept, Opening entry. Closing entries, Transfer entries. Adjusting
- Errors: Meaning, Causes of accounting errors, Types of errors, Errors disclosed and not
- Rectification of errors before and after preparation of Trial Balance, Suspense account:

**Unit 8: Reserve and Provision** **LH2**

- Concept and Objectives of Reserve and Provision
- Maintaining General reserve, Provision for bad debt. Provision for discount on debtors

**Unit 9: Capital and Revenue concept and creditors** **LH2**

- Concept, Types and Difference between Capital and Revenue: Receipts, Expenditures,

**Unit 10: Financial Statements** **LH11**

- Concept and Types of financial statements
- Preparation of Income Statements and Balance Sheet with and without adjustment by
- Cash flow statement: Meaning, Importance, Preparation of cash flow statement based on Losses and Profits using Work Sheet showing cost of goods sold direct method.

**References:**

- Madhav R. Koirala, and et al. *Principles of Accounting - I*, Buddha Academic Enterprises Pvt. Ltd., Kathmandu.
- Paul D. Kimmel, Jerry J. Weygandt, and Donald E. Kieso., *Financial Accounting*, John Wiley & sons, INC; New York.
- Ramesh Pandey, and et al., *Principles of Accounting Part 1*, Bhundhipuran Prakashan, Kathmandu.
- Ratna M. Dangol and et al., *A Basic Course In Accountancy I*, Talaju Prakashan, Kathmandu.
- R. Narayanaswamy., *Financial Accounting, A Managerial Perspective*, Prentice Hall of India Private Limited, New Delhi.
- Robert L. Dansby, Burton S. Kaliski and Michael D. Lawrence, *College Accountancy*, A.I.T.B.S. Publishers & Distributors, Delhi.
- Shiva P. Munankarmi, *Principles of Accounting*, Educational Publishing House, Kathmandu.

# IT 215 : Web Programming I

*Credit Hours: 3*  
*Lecture Hours: 48*

## **Course Objective :**

This course is designed to serve as an ideal beginners guide to writing web pages using XHTML, using CSS to make pages more appealing and add interactivity to pages using JavaScript.

## **Course description:**

Structuring Documents for the Web, Links and Navigation, Images, Audio, and Video, Tables, Forms, Cascading Style Sheets, More Cascading Style Sheets, Page Layout, Design Issues, Learning JavaScript, Working with JavaScript

## **Course Details**

### **Unit 1: HTML**

**LH16**

- **Structuring Documents for the Web**

A Web of Structured Documents, Introducing HTML and XHTML, Tags and Elements, Separating Heads from Bodies, Attributes Tell Us About Elements, Learning from Others by Viewing Their Source Code, Elements for Marking Up Text , The <html> Element, The <head> Element, The <title> Element, The <body> Element

- **Basic Text Formatting , Presentational Elements, Phrase Elements**

White Space and Flow, Creating Headings Using <h> Elements, Creating Paragraphs Using the <p> Element, Creating Line Breaks Using the <br /> Element, Creating Preformatted Text Using the <pre> Element , The <b>Element, The <i>Element, The <tt> Element, The <sup> Element, The <sub> Element, The <big> Element, The <small> Element, The <hr /> Element, The <em> Element Adds Emphasis, The <strong> Element Adds Strong Emphasis, The <address> Element Is for Addresses, The <abbr> Element Is for Abbreviations, The <acronym> Element Is for Acronym Use, The <dfn> Element Is for Special Terms, The <blockquote> Element Is for Quoting Text, Using the cite Attribute with the <blockquote> Element, The <q> Element Is for Short Quotations, The <cite> Element Is for Citations, The <code> Element Is for Code , The <kbd> Element Is for Text Typed on a Keyboard, The <var> Element Is for Programming Variables, The <samp> Element Is for a Program Output

- **Lists**

Using the <ul> Element to Create Unordered Lists, Ordered Lists, Definition Lists, Nesting Lists, Comments, Understanding Block and Inline Elements, Grouping Elements with <div> and <span>, The XML Declaration, Document Type Declaration

- **Understanding Directories and Directory Structures**

Understanding URLs, Absolute and Relative URLs, The <base> Element

- **Creating Links with the <a> Element**

Basic Links, Linking to Other Web Pages, Linking to E-mail Addresses, Creating a Source Anchor with the href Attribute, Creating a Destination Anchor Using the name and id Attributes , (Linking to a Specific Part of a Page), The <a> Element's Other Attributes,

- **Images, Audio, and Video, Using Images as Links, Choosing the Right Image Format**

Adding Images Using the <img> Element, The src Attribute, The alt Attribute , The height and width Attributes, The ismap and usemap Attributes, The longdesc Attribute, Image Maps, Client-Side Image Maps, Server-Side Image Maps, GIF Images, Animated GIFs, JPEG Images, PNG Images , Keeping File Sizes Small

- **Adding Flash, Video, and Audio to Your Web Pages**

Adding Flash Movies to Your Site, Adding Videos to Your Site, Adding Videos, Using Flash

Video

Audio to Your Site, Automatically Playing Audio and Video When a Page Loads, A Closer Look at the <object> and <param> Elements, The <param> Element

- **Tables**

Introducing Tables, Basic Table Elements and Attributes, The <table> Element Creates a Table, The <tr> Element Contains Table Rows, The <td> and <th> Elements Represent Table Cells, Adding a <caption> to a Table, Grouping Sections of a Table, Spanning Columns Using the colspan Attribute, Spanning Rows Using the rowspan Attribute, Splitting Up Tables Using a Head, Body, and Foot , Grouping Columns Using the <colgroup> Element , Columns Sharing Styles Using the <col> Element

- **Forms and Form Controls**

Introducing Forms, Creating a Form with the <form> Element

The action Attribute , The method Attribute, The id Attribute, The onsubmit Attribute, The onreset Attribute, The enctype Attribute, The accept-charset Attribute, The accept Attribute, The target Attribute, White Space and the <form> Element

Text Inputs, Buttons, Checkboxes, Radio Buttons, Select Boxes, File Select Boxes, Hidden Controls,

- **Creating Labels for Controls and the <label> Element**

Structuring Your Forms with <fieldset> and <legend> Elements

Focus, Tabbing Order, Access Keys, Disabled and Read-Only Controls, Sending Form Data to the Server, HT TP get , HT TP post, Cascading Style Sheets 243

*After completion of this section following web-pages have to be developed:*

- ✓ Web page with list and menus
- ✓ Different look and feel web pages using divisions
- ✓ Photo gallery
- ✓ Page with internal and external links
- ✓ Web page with videos
- ✓ User interface with different controls to take user data should be developed

## Unit 2 : Introducing CSS

LH16

A Basic Example, Inheritance,, Where You Can Add CSS Rules, The <link> Element, The <style> Element, Advantages of External CSS Style Sheets, CSS Properties

- **Controlling Text**

The font-family Property, The font-size Property, The font-weight Property, The font-style Property,

The font-variant Property, The font-stretch Property, The font-size-adjust Property,

- **Text Formatting**

The color Property, The text-align Property, The vertical-align Property, The text-decoration Property,

The text-indent Property, The text-shadow Property, The text-transform Property, The letter-spacing Property, The word-spacing Property, The white-space Property, The direction Property

- **Selectors**

Universal Selector, The Type Selector, The Class Selector, The ID Selector, The Child Selector, The Descendant Selector, The Adjacent Sibling Selector

- **The General Sibling Selector**

Using Child and Sibling Selectors To Reduce Dependence on Classes in Markup, Attribute Selectors,

- **Lengths**

Relative Units, Absolute Units, Percentages

- **Introducing the Box Model**

An Example Illustrating the Box Model, The Border Properties, The padding Property, The margin Property, Dimensions of a Box, Internet Explorer Box Model Bug

- **More Cascading Style Sheets**  
Links, Backgrounds: The background-color Property, The background-image Property, The background-repeat Property, The background-position Property (for Fixing Position of Backgrounds), The background-attachment Property (for Watermarks), The background Property (the Shorthand)
- **Lists**  
The list-style-type Property, The list-style-position Property, The list-style-image Property, The list-style Property (the Shorthand)
- **Tables**  
Table-Specific Properties, The border-collapse Property, The border-spacing Property, The empty-cells Property, The caption-side Property, The table-layout Property
- **Outlines**  
The outline-width Property, The outline-style Property, The outline-color Property, The outline Property (the Shorthand)
- **The :focus and :active Pseudo-Classes**  
Generated Content  
The :before and :after Pseudo-Elements, The content Property, The cursor Property, The display Property, The visibility Property
- **Positioning and Layout with CSS**  
Normal Flow, The position Property, Box Offset Properties, Relative Positioning, Absolute Positioning,  
Fixed Positioning, The z-index Property, Floating Using the float Property, The clear Property
- **Page Layout**  
Understanding the Site's Audience  
Who Will Visit the Site? Why Have They Visited Your Site? What Does a Visitor Need to Achieve a Goal? How Often Will People Want to Visit? Things You Want the Site to Do, Prioritizing Information, Grouping and Categorization, Creating a Site Map, Identifying Key Elements for Each Page, Page Size (and Screen Resolution), Understanding Screen Sizes, Fixed-Width vs. Liquid Designs  
*After completing CSS,*  
Program with different kinds of styles should be developed

### Unit 3 : Learning JavaScript

LH16

What Is Programming About? How to Add a Script to Your Pages, Comments in JavaScript, The <noscript> Element, The Document Object Model, Accessing Values Using Dot Notation, The Document Object, The Forms Collection, Form Elements, Images Collection, Different Types of Objects, A Word About Data Types, Keywords,

- **Starting to Program with JavaScript**  
Variables, Assigning a Value to a Variable, Lifetime of a Variable, Operators, Arithmetic Operators, Assignment Operators, Comparison Operators, Logical or Boolean Operators, String Operator (Using + with Strings)
- **Functions**  
How to Define a Function, How To Call a Function, The Return Statement
- **Conditional Statements**  
if Statements, if . . . else Statements, switch Statement
- **Looping**  
While, do . . . while, for, Infinite Loops and the break Statement
- **Events**  
Built-in Objects: String, Date, Array, Window

- **Form Validation**

When to Validate, What You Can Check For, How to Check a Form, Checking Text Fields, Select Box Options, Radio Buttons, Checkboxes

*After completion of JavaScript:*

- User interface with form validation capability should be developed, (validation: check for empty fields, specific length string, email validation etc)

*After completion of this course, web site with data entry form with form validation functionality and attractive look and feel should be developed*

**Reference**

Beginning HTML, XHTML, CSS, and JavaScript, Jon Duckett, Wiley, ISBN: 978-0-470-54070-1

# IT 216: JAVA Programming – I

*Credit Hours: 3*  
*Lecture Hours: 48*

## Course Objective

This course aims to develop students' skill in JAVA programming. Students are expected to have the basic knowledge of programming with 'C' language. This course should be associated with laboratory experiments to augment the concepts taught in the class.

## Course Description:

Java's Lineage, An overview of Java, Data types, Variables and Arrays, Operators, Control Statements, Introducing Classes, A Closer Look at Methods and classes, Inheritance, Packages and Interface, Exception handling, Multithreaded programming, Enumerations, autoboxing, and annotations, String handling, Input/output

## Course Details

### Unit 1 : Java's Lineage

2hrs

- The Creation of Java
- How Java Changed the Internet
- The Bytecode
- Servlets: Java on the Server Side
  - Simple
  - Object-oriented
  - Robust
  - Multithreaded
  - Architecture Neutra
  - Interpreted and High Performance
  - Distributed
  - Dynamic

### Unit 2 : An overview of Java

2hrs

- Object-Oriented Programming
  - Two Paradigms
  - Abstraction
  - The Three OOP Principles
- Lexical Issues
  - Whitespace
  - Identifiers
  - Literals
  - Comments
  - Separators
  - The Java Keywords

### Unit 3 : Data types, Variables and Arrays

LH4

- Java is a strongly Typed Language
- The Primitive Types
- Integers
  - Byte, short, int, long
- Floating point Types
  - Float, double
- Characters
- Booleans
- A closer Look at Literals
  - Integer Literals, Floating-Point literals, Boolean Literals, Character Literals, String Literals
  - Variables:
    - ✓ Declaring a Variable, Dynamic Initialization, The Scope and Lifetime of Variables
    - ✓ Type conversions and Casting, Casting Incompatible types
  - Automatic Type promotion Rules
  - Arrays
    - ✓ One Dimensional Arrays, Multidimensional arrays, Alternative Array Declaration syntax
  - Scanner Object

### Unit 4 : Operators

LH4

- Arithmetic Operators: +,-,/,\*,%,++,--
- The Bitwise operators:
  - The bitwise logical operators
  - The left shift, right shift, Unsigned Right shift, bitwise operator compound assignments
- Relational operators
- Boolean logical operators
  - Short-circuit logical operators
  - The ? operator
  - Operator precedence
  - Using parenthesis

### Unit 5 : Control Statements

LH5

- Java' Selection statements
  - If...., switch....,
  - Iteration statements: while, do-while, for, the for-each version of the for loop, nested loops
- Jump statements: using break, using continue

*After the completion of above five units, programs like following should be developed:*

- ✓ Multiple choice problems
- ✓ Working on sequence of values (calculating average, mean, mode etc.)

## Unit 6 : Introducing Classes

LH4

- Class fundamentals
  - The general form of a class, a simple class
- Declaring objects
- Assigning Object Reference variables
- Introducing methods
  - Adding a method to the box class, returning a value, adding a method that takes parameters
- Constructors: Parameterized Constructors
- The this keyword: instance variable hiding
- Garbage collection
- The finalized() method
- A Stack class

## Unit 7 : A Closer Look at Methods and classes

LH4

- Overloading methods; overloading constructors
- Using objects as parameters
- A closer look at arguments passing, returning objects, recursion, introducing access control, understanding static, introducing final, arrays revisited, introducing nested and inner classes, exploring the string class, using command-line arguments
- Varargs: variable-length arguments; overloading vararg methods, varargs and ambiguity

## Unit 8 : Inheritance

LH3

- Inheritance Basics: Member access and inheritance,
- Using super: using super to call superclass constructors, a second use for super
- Creating a multilevel hierarchy
- When constructors are called
- Method overriding
- Dynamic method dispatch: why overridden method?
- Using abstract classes, using final with inheritance
- The object class

*After completion of above three units following programs should be developed:*

- ✓ Program that work on group of similar objects like, generating average age of employees, displaying maximum salary of employees, displaying names of persons with same address etc.

## Unit 9 : Packages and Interface

3hrs

- Packages: defining a package, finding packages and CLASSPATH
- Access Protection
- Interfaces: defining an interface, implementing interfaces, nested interfaces, applying interfaces, variables in interfaces, interfaces can be extended

**Unit 10 : Exception handling****LH3**

- Exception-handling fundamentals, exception types, uncaught exceptions, using try..catch
- Multiple catch clauses
- Nested try statements
- Throw, throws, finally, Java's built –in exception
- Creating your own exception subclasses

**Unit 11 : Multithreaded programming****LH4**

- The Java Thread Model
- Thread priorities, synchronization, messaging, the thread class and the runnable interface
- The main thread
- Creating a thread: implementing runnable, extending thread
- Creating multiple threads: using isAlive() and join()
- Thread priorities
- Synchronization: using synchronized methods, the synchronized statement

**Unit 12 : Enumerations, autoboxing, and annotations****LH 3**

- Enumerations
  - Fundamentals, the values() and valueOf() methods, Java Enumerations Are class types, enumerations inherit Enum
  - Type Wrappers: character, Boolean, the numeric type wrappers
- Autoboxing
  - Autoboxing and methods, autoboxing/unboxing occurs in expressions, autoboxing/unboxing Boolean and character values, autoboxing/unboxing helps prevent errors
- Annotations
  - Annotation basics, specifying a retention policy, obtaining annotations at run time by use of reflection

**Unit 13 : String handling****LH3**

- The String constructors, string length,
- Special string operators: string literals, concatenation, conversion and toString()
- Character Extraction
  - charAt(), getChars(), getBytes(), toCharArray()
  - String comparison: equals() and equalsIgnoreCase(), regionMatches(), startsWith() and endsWith(), equals() versus ==, compareTo
- Modifying a String
  - Substring(), concat(), replace(), trim()

*After completion of above two units programs like following should be developed:*

- ✓ Efficient codes with minimum code redundancy
- ✓ Program capable of handling errors on own instead of terminating programs abnormally

## **Unit 14 : Input/output:**

**LH4**

- File: directories, using filenameFilter, the listFiles(), creating directories
- The Autocloseable, Closeable, and Flushable Interfaces
- I/O Exceptions
- The stream classes
- The byte Streams: InputStream, OutputStream, FileInputStream, FileOutputStream, PrintStream, DataOutputStream and DataInputStream, RandomAccessFile
- The Character Streams:
- Reader, Writer, FileReader, FileWriter, PrintWriter
- The Console Class
- Serialization: Serializable, Externalizable, ObjectOutput, ObjectOutputStream ObjectInput, ObjectInputStream

*After completion of this unit, program which record keeping capability with searching, manipulating features should be developed.*

### ***Textbooks:***

1. ***Thinking in JAVA- Bruce Fikal***
2. ***Complete reference for JAVA 2***
3. ***Schaum's outline programming in C++- John Hubbard***

# IT 217 : Computer Organization

*Credit Hours: 3*  
*Lecture Hours: 48*

## **Course Objective:**

This module aims to provide knowledge to understand the architecture of hardware components used in organization and design of digital computers and also design procedures of digital computers. Laboratory work is essential in this module.

## **Course Description:**

Digital components used in the organization and design of digital computers, detailed steps that a designer must go through in order to design an elementary basic computer, the organization and architecture of CPU, I/O and Memory, Pipelining and Vector Processing, Concept of Multiprocessing.

## **Course Details**

- 1. Data Representation** **LH 3**
  - 1.1 Data Types
  - 1.2 Complements
  - 1.3 Fixed Point Representation
  - 1.4 Floating Point Representation
  - 1.5 End of Chapter 1 Assignment:
    - 1.5.1 Computer Program: Write program to visualize the representation of complement numbers, integers, floating point numbers and character data, overflow detection while adding binary data.
  
- 2. Register Transfer and Microoperations** **LH 3**
  - 2.1 Register and Register Transfer Language
  - 2.2 Bus and Memory Transfers
  - 2.3 Arithmetic, Logic and Shift Micro-operations
  - 2.4 Arithmetic Logic Shift Unit
  
- 3. Basic Computer Organization and Design** **LH 7**
  - 3.1 Instruction Codes
  - 3.2 Computer Registers
  - 3.3 Computer Instructions
  - 3.4 Timing and Control
  - 3.5 Instruction Cycle
  - 3.6 Input Output and Interrupt
  - 3.7 End of Chapter 2 and 3 Assignment:
    - 3.7.1 Circuit Design: Design of Basic Computer
  
- 4. Programming the Basic Computer** **LH 5**
  - 4.1 Introduction
  - 4.2 Machine Language
  - 4.3 Assembly Language
  - 4.4 The Assembler
  - 4.5 Program Loops
  - 4.6 Programming Arithmetic and Logic Operations
  - 4.7 Subroutines

- 4.8 Input Output Programming
- 4.9 End of Chapter 3 and 4 Assignment:
  - 4.9.1 Computer Program: Develop assembler which can execute the program written for Basic Computer.
  
- 5. Microprogrammed Control LH 3**
  - 5.1 Control Memory
  - 5.2 Address Sequencing
  - 5.3 Microprogram Example
    - 5.3.1 Computer Configuration
    - 5.3.2 Microinstruction Format
  
- 6. Central Processing Unit LH 4**
  - 6.1 CPU Organizations
  - 6.2 Instruction Formats
  - 6.3 Addressing Modes
  - 6.4 RISC and CISC Characteristics
  - 6.5 End of Chapter 5 and 6 Assignment:
    - 6.5.1 Computer Program: Write program to illustrate the use of different addressing modes.
  
- 7. Pipeline and Vector Processing LH 6**
  - 7.1 Parallel Processing, Flynn's Classification of Computers
  - 7.2 Pipelining
  - 7.3 Arithmetic Pipeline
  - 7.4 Instruction Pipeline
  - 7.5 Pipeline Hazards and Their Solution
  - 7.6 Array and Vector Processing
  - 7.7 End of Chapter 7 Assignment:
    - 7.7.1 Case Study: Available array and vector processor; their application domain
    - 7.7.2 Computer Program: write program which simulates instruction pipeline and arithmetic pipeline. Program generates space time diagram considering pipeline hazards.
  
- 8. Computer Arithmetic LH 4**
  - 8.1 Addition and Subtraction of Signed Magnitude Data
  - 8.2 Addition and Subtraction of Signed 2's Complement Data
  - 8.3 Multiplication of Signed Magnitude Data
  - 8.4 Multiplication of Signed 2's Complement Data
  - 8.5 End of Chapter 8 Assignment:
    - 8.5.1 Computer Program: Implement all algorithms learned in this chapter.
  
- 9. Input and Output Organization LH 5**
  - 9.1 Peripheral Devices
  - 9.2 I/O Interface
  - 9.3 Asynchronous Data Transfer
  - 9.4 Modes of Transfer
  - 9.5 Priority Interrupt
  - 9.6 Direct Memory Access
  - 9.7 I/O Processor

9.8 End of chapter 9 Assignment:

9.8.1 Case Study: Device Independence I/O Software; USB (universal serial bus)

## 10. Memory Organization

LH 4

10.1 Memory Hierarchy

10.2 Main Memory

10.3 Associative Memory

10.4 Cache Memory

10.5 Virtual Memory

10.6 Memory Management Hardware

10.7 End of Chapter 10 Assignment:

10.7.1 Computer Program: write program to visualize the advantage of using memory hierarchy.

## 11. Multiprocessor

LH 4

11.1 Characteristics of Multiprocessor

11.2 Interconnection Structures

11.3 Inter Processor Arbitration

11.4 Inter Processor Communication and Synchronization

11.5 Cache Coherence

11.6 End of chapter 11 Assignment:

11.6.1 Case Study: ARM multicore processors and Intel multicore processors

11.6.2 Computer Program: Simulate cache coherence problem and simulate solution too.

## Course Book

➤ M. Morris Mano, “*Computer System Architecture*”, 3<sup>rd</sup> edition, Pearson Education Asia

## References

➤ Andrew S. Tanenbaum, “*Structured Computer Organization*”, 4<sup>th</sup> edition, Prentice Hall Inc

➤ David A Patterson and John L. Hennessy, “*Computer Organization and design*”

➤ Sajjan G. Shiva, “*Computer Design And Architecture*”, 3<sup>rd</sup> edition, Marcel Dekker Inc

➤ Daniel Page, “*A Practical Introduction to Computer Architecture*”, Springer

# STT 201: Business Statistics

(BBA, BIM 3<sup>rd</sup> Semester)

**Credit Hours: 3 Hours**

***Nature of the course:***

Theory and Practical with EXCEL (60% + 40%)

The student must succeed in Theory exam and Practical exam separately

***Course Objectives:***

This course introduces the students to statistical tools and techniques which are applied to in business decision-making. The course will cover the basic tools used to describe data for the purposes of transforming data into information. In addition, the course will present the fundamentals of statistical inference showing how it is possible to examine a small subset of data to reach conclusions about the larger set of data.

The statistical tools should be introduced from an applied perspective using business related examples. Microsoft Excel software will be used throughout the course to aid in statistical analysis.

***Course Content:***

**Unit 1 Describing Data using Graphs and Tables 4 hrs**

Statistics in Business, Frequency distribution, Stem-and-leaf plots, Diagrams and Graphic presentation of Frequency distribution – Histogram, Ogive curve

**Unit 2 Describing Data Using Numerical Measures 9 hrs**

Measures of Central Tendency (Mean, Median and Mode), Partition values (quartiles, deciles and percentiles), Measures of variation (Range, Inter Quartile Range, quartile deviations), Variance and standard deviation, Coefficient of Variation, Skewness, Kurtosis, Five number summary, Box-Whisker plot,

**Unit 3 Probability 5 hrs**

Sample Space and Events, Probability, laws of probability, conditional probability, Baye's theorem.

**Unit 4 Probability Distributions 5 hrs**

Random variable, Mathematical Expectation , Binomial Distribution, Poisson Distribution, Normal Distribution.

**Unit 5 Sampling Theory and Sampling Distributions 4 hrs**

Population and Sample, Sampling Methods, Central limit theorem, Sampling Distribution of Mean and Proportion.

**Unit 6 Estimation 5 hrs**

Estimation, Properties of Good Estimator: Consistency, unbiasedness, efficiency and sufficiency, Point and interval estimates, Margin of Error and Levels of Confidence, Confidence interval estimates for mean and proportion,

**Unit 7 Introduction to Hypothesis Testing****7 hrs**

Concept of Hypothesis Testing, Steps of Hypothesis Testing, Hypothesis Testing for Mean and Proportions for large Sample, Hypothesis Testing Using Critical Value approach, Confidence Limit approach,  $p$ -value approach.

**Unit 8 Simple Linear Correlation****5 hrs**

Scatter plot, Measures to describe correlation, Pearson's product moment correlation coefficient, Correlation Coefficient for Bi-Variate Data, test of significance of Sample Correlation Coefficient using Probable Error, Spearman's rank correlation coefficient

**Unit 9 Simple Linear Regression****4 hrs**

Linear models, Assumptions of the linear model, Linear regression model, Obtaining the least-squares linear regression model, interpretation of regression Coefficients,

**Reference books:**

1. David M. Levine and et al, *Statistics for managers using MS excel Pearson*
2. Glyn Davis and Branco Pecar, *Business Statistics using EXCEL*, Oxford University Press

# ACC 202: Cost and Management Accounting

*Credits: 3*

*Lecture Hours: 48*

## **Course Objective**

The primary objective of the module is to provide students with an understanding of the concepts, tools and techniques of cost and management accounting and their application in managerial decision making.

## **Course Description**

This course comprises conceptual foundation of cost and management accounting, segregation of cost, accounting for material and labour, allocation apportionment and absorption of overhead cost, income statement under variable and absorption costing technique, standard costing system with material and labour cost variance, flexible budgeting under different levels of activities, overhead cost variance, preparation of functional and financial budget in a manufacturing/non-manufacturing concern, decision regarding alternative choices.

## **Unit 1: Conceptual Foundation**

**LH 4**

**Cost & management accounting:** Meaning, objectives, importance, advantages and limitations, differences between financial accounting and cost accounting, management accounting and cost accounting.

**Cost concept and its classification.**

**Concept and method of cost segregation:** i) Two point method and ii) Least square method & iii) Estimation of cost

## **Unit 2: Accounting for Materials**

**LH 3**

**Materials/Inventory:** Concept, reasons and objectives for holding material / inventory.

**Inventory Control:** Meaning, importance and techniques, Economic order quantity with and without discount, Re-order, maximum, minimum, danger and average stock levels under the condition of certainty.

## **Unit 3: Accounting for Labour Cost**

**LH 3**

**Labour cost:** Concept and need for control of labour cost.

**Incentive wages Plan:** Halsey and Rowan premium Plan, Taylor's differential piece rate system, Gantt's Task and Bonus plan.

## **Unit 4: Accounting for Overhead Cost:**

**LH 4**

**Overhead cost:** Meaning, classification, importance

**Accounting and Distribution of overhead cost:** Allocation, apportionment and absorption of overhead cost.

## **Unit 5: Accounting for Profit Planning**

**LH 8**

**Absorption costing:** Concept, importance, income statement under absorption costing technique, limitations.

**Variable costing:** Concept, importance, income statement under variable costing technique, reconciliation statement between absorption and variable costing techniques showing the causes of difference.

**Cost Volume profit analysis:** Meaning, importance, Contribution margin analysis, Break-even-analysis: under constant and the following underlying situations: changes on selling price, fixed cost, & variable cost, and under step fixed cost, Break-even-analysis of multi-products firms, assumptions of CVP analysis and its limitations.

## **Unit 6: Standard costing**

**LH 4**

**Standard costing:** Concept, preliminaries to establish standard costing system, difference between standard costing and budgetary control, advantages and limitations.

**Variance analysis:**

**Material variance:** Concept and calculation of cost, price, usage, mix and yield variances.

**Labour variance:** Concept and calculation of cost, efficiency, rate, mix, idle time and yield variances.

**Unit 7: Flexible budgeting**

**LH 4**

**Flexible budgeting:** Limitations of static budget, concept, importance of flexible budget, flexible budgeting for overhead cost control, flexible budget in different level of activity.

**Overhead cost variance:** Concept and calculation of capacity, efficiency and spending variances.

**Unit 8: Budgeting and Profit Planning**

**LH 12**

Concept and objectives of budget. Preparation of budget for manufacturing and non-manufacturing concern: sales budget, production budget, purchase budget, direct labour and overhead cost budget. Cash collection and disbursement budget, budgeted income statement, budgeted balance sheet.

**Unit 9: Accounting for Alternative Choices for Decision Making**

**LH 6**

Concept of decision making, types of decision making: Make or buy decision, Drop or continue decision, Accept or reject special offer, decision to sell or further processing.

**Suggested Books**

Ronald W. Hilton, and David E. Platt *Managerial Accounting*, McGraw Hill, Irwin.

Charles T. Horngren, Srikant M. Datar and George Foster, *Cost Accounting , A managerial Emphasis*, Pearson Education

Colin Drury, *Management and Cost Accounting*, ELBS with Chapman and Hall Jerry J. Weygandt, Jawahar Lal, *Cost Accounting*, Tata McGraw Hill Co., New Delhi

T. Lucy, *Cost Accounting*, Tata McGraw Hill Co., New Delhi.

M.R. Koirala, and et.al, *Cost and Management Accounting*, Buddha Academy Publication House, Kathmandu.

Yamesh man Singh, Khagendra P. Ojha, Chiranjibi Acharya, *Cost and Management Accounting*, Buddha Academic Publishers and Distributors Pvt.Ltd.

R.M. Dangol and et.al, *Cost and Management Accounting*, Taleju Publishing House, Kathmandu

Koirala, Y.R. and et.al, *Cost and Management Accounting*, Ashmita Publication, Kathmandu.

# ECO 201: Microeconomics

*Credits: 3*

*Lecture Hours: 48*

## **Course Objectives**

This module aims to develop students' understanding of the microeconomic concepts and theories in order to enhance their skill in analyzing business opportunities, market and risks.

## **Course Description**

Microeconomics: concepts and uses. Theory of demand and supply: demand function, change in quantity demanded and change in demand, supply function: change in quantity supplied and change in supply, elasticity of demand and supply – concepts, degrees and measurements. Utility Analysis: cardinal vs ordinal utility and indifference curve analysis. Theory of production: Production function, laws of production. Cost and revenue curves. Pricing: Price and output determination under perfect competition, monopoly and monopolistic competition, concept of oligopoly. Factor pricing: rent (modern theory of rent) wages (marginal productivity theory), interest (loanable fund theory and liquidity preference theory) and profit (dynamic theory and innovation theory).

## **Course Details**

### **Unit 1: Introduction to Microeconomics**

**LH 3**

Meaning, Scope, Types, Uses

### **Unit 2: Theory of Demand and Supply**

**LH 6**

Demand function : Meaning and types, Movement along a demand curve and shifts in demand curve. Supply Function. Meaning and types, Movement along a supply curve and shifts in supply curve Concept of Elasticity of demand and supply, Price elasticity of demand: degrees, measurement (percentage, total outlay, point and arc methods), uses in business decision making, Income elasticity of demand: degrees, measurement (percentage, arc and point methods), Cross elasticity of demand: types, measurement (percentage and arc methods), Price elasticity of supply: degrees, measurement (percentage, point and arc methods).

*Measurement of elasticity*

### **Unit 3: Theory of Consumer's Behaviour**

**LH 8**

Cardinal vs ordinal utility. Indifference curve analysis : Meaning, assumptions and properties, Principle of MRS, Consumer's equilibrium, Price effect – derivation of PCC and demand curves for normal goods (substitutes and complements), Income effect – derivation of ICC and Engel curves for normal goods and inferior goods , Substitution effect – Hicksian approach, Decomposition of price effect into income and substitution effects – Hicksian approach , Applications – tax and subsidy, income leisure choice of workers

*Computations and Numerical assignments*

**Unit 4: Theory of Production****LH 7**

Concept of total, average and marginal product. Production function – meaning, types (short run and long run production function, Cobb-Douglas production function. Law of variable proportions (explanation of three stages of production with reasons). Isoquants: Meaning, assumptions and properties, Principle of marginal rate of technical substitution, Optimal employment of two inputs (or least cost combination of two inputs), Laws of returns to scale, Explanation with table and diagram (using IQ).

*Computations and Numerical assignments*

**Unit 5: Cost and Revenue Curves****LH 8**

Cost function. Various concepts of costs: opportunity cost, explicit and implicit costs, accounting and economic costs. Short run costs: Behavior of short run total costs, Behavior of average and marginal cost curves, Relation between AC and MC, TVC and MC and AC and AFC and AVC. Long run costs, Meaning, Derivation of U-shaped and L-shaped LAC with reasons. Revenue: Revenue under perfect competition, Revenue under imperfect competition, Relationship of Revenues (TR, AR and MR) with price elasticity of demand.

*Computations and Numerical assignments*

**Unit 6: Theory of Product Pricing****LH 10**

Profit maximization and equilibrium of a firm: TR-TC approach (table and diagram), MR-MC approach (table and diagram). Equilibrium price and output determination under perfect competition: Meaning and characteristics, Derivation of short run supply curve of a firm, Short run equilibrium (firm and industry), Long run equilibrium (firm and industry). Equilibrium price and output determination under monopoly: Meaning and characteristics, Short run equilibrium, Long run equilibrium, Meaning and conditions of price discrimination, Degrees of price discrimination, Equilibrium of firm under third degree discrimination. Equilibrium price and output determination under monopolistic competition: Meaning and characteristics, Short run equilibrium, Long run equilibrium of a firm. Oligopoly: Meaning and characteristics.

*Computations and Numerical assignments*

**Unit 7: Theory of Factor Pricing****LH 6**

Rent: Concept of economic rent and its determination: modern theory of rent. Wages: Marginal productivity theory of wages. Interest: Loanable funds theory of interest, Liquidity preference theory of interest. Profits, Dynamic theory of profits, Innovation theory of profits.

*Computations and Numerical assignments*

**References**

- Ahuja, H.C. *Advanced Economic Theory – Micro Economic Analysis*, New Delhi – S. Chand (Latest ed.)  
Browning and Browning (1994), *Microeconomic Theory and Applications*, New Delhi, Kalyani Publishers  
Case, Karl E. and Ray C. Fair, (2002), *Principles of Economics*, Singapore, Pearson Education  
Dwivedi DN (2003), *Microeconomics Theory and Applications*, Delhi, Pearson Education Pvt. Ltd.  
Dwivedi DN (2010), *Microeconomics Theory and Practice*, New Delhi, Tata McGraw Hill.  
Koutsoyianis, A (1979), *Modern Microeconomics*, London, Macmillan  
McConnell CR and S. Brue, (2002), *Economics : Principles, Problems and Policies*, New York, McGraw Hill.

# IT 218: Data Structure and Algorithm with Java

## Course Objectives

This course aims to provide a systematic introduction to data structures and algorithms for constructing efficient computer programs. The course emphasizes on data abstraction issues (through ADTs) in the program development process, and on efficient implementation of chosen data structures and algorithms. Laboratory work is essential in this course.

## Course Description

The course contains Complexity Analysis, Linked Lists, Stacks and Queues, Recursion, Binary Trees, Multiway Trees, Graph, Sorting, Hashing.

## Course Details

### Unit 1: Complexity Analysis

**LH 4**

Computational and Asymptotic Complexity. Big-O Notation. Properties of Big-O Notation and  $\Omega$ . Possible Problems. Examples of Complexities. Finding Asymptotic Complexity: Examples. The Best, Average, and Worst Cases 66. Amortized Complexity 69. NP-Completeness 73.

### Unit 2: Linked Lists

**LH 5**

Singly Linked Lists: Insertion, Deletion, Search. Doubly Linked Lists: Circular Lists, Skip Lists, Self-Organizing Lists. Sparse Tables. Case Study: A Library.

### Unit 3: Stacks and Queues

**LH 4**

Stacks, Queues, Priority Queues. Case Study: Existing a Maze.

### Unit 4: Recursion

**LH 4**

Recursive Definitions. Method Calls and Recursion Implementation. Anatomy of a Recursive Call. Tail Recursion. Nontail Recursion. Indirect Recursion. Nested Recursion. Excessive Recursion. Backtracking.

### Unit 5: Binary Trees

**LH 9**

Trees, Binary Trees, and Binary Search Trees. Implementing Binary Trees. Searching a Binary Search Tree. Tree Traversal. Breadth-First Traversal. Depth-First Traversal. Insertion, Deletion, Deletion by Merging, Deletion by Copying. Balancing a Tree. The DSW Algorithm. AVL Trees. Self-Adjusting Trees. Self-Restructuring Trees, Splaying. Heaps: Heaps as Priority Queues, Organizing Arrays as Heaps, Polish Notation and Expression Trees. Operations on Expression Trees. Case Study: Computing Word Frequencies 280.

**Unit 6: Multiway Trees****LH 5**

The Family of B-Trees. B-Trees, B\*-Trees, B+-Trees. Case Study: Spell Checker

**Unit 7: Graphs****LH 6**

Graph Representation. Graph Traversals, Shortest Paths, All-to-All Shortest Path Problem, Cycle Detection. Spanning Trees. Connectivity. Connectivity in Undirected Graphs, Connectivity in Directed Graphs. Topological Sort, Networks.

**Unit 8: Sorting****LH 6**

Elementary Sorting Algorithms Insertion Sort, Selection Sort, Bubble Sort. Efficient Sorting Algorithms: Heap Sort, Quicksort, Mergesort, Radix Sort. Case Study: Adding Polynomials.

**Unit 9: Hashing****LH 5**

Hash Functions: Division, Folding, Mid-Square Function, Extraction. Collision Resolution: Open Addressing, Chaining, Bucket Addressing, Deletion. Case Study: Hashing with Buckets.

***Textbooks:***

***Drozdek Adam, Data Structures and Algorithms in Java, 3<sup>rd</sup> edition***

***Reference:***

- ***Duncan A. Buell, Data Structures Using Java***
- ***Main Michael, Data Structures and Other Objects Using Java, Prentice Hall (4<sup>th</sup> edition),***
- ***Robert Lafore, Data Structures and Algorithms in Java, Sams Publishing;***
- ***Narasimha Karumanchi, Data Structures And Algorithms Made Easy In Java, CareerMonk Publications***

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# IT 219: Web Technology - II

*Credits: 3*

*Lecture Hours: 48*

## **Course Objective**

This course will teach to develop interactive and dynamic web sites. Currently dynamism has become vital part of web site for any organization. This course will be of great help for student in integrating dynamism in their web sites that have competitive advantage.

## **Course Description:**

Orientation and First Steps, Working with Text and Numbers, Making Decisions and Repeating, working with arrays, function, Web forms, working with databases, Remembering Users with Cookies and Sessions, Handling Dates and Times, Working with Files

### **Unit 1: Orientation and First Steps**

**LH 2**

PHP's Place in the Web World, What's So Great About PHP?, PHP in Action, Basic Rules of PHP Programs.

### **Unit 2: Working with Text and Numbers**

**LH 2**

Text, Numbers, Variables

### **Unit 3: Making Decisions and Repeating Yourself**

**LH 5**

Understanding true and false, Making Decisions, Building Complicated Decisions, Repeating Yourself.

### **Unit 4: Working with Arrays**

**LH 5**

Array Basics, Looping Through Arrays, Modifying Arrays, Sorting Arrays, Using Multidimensional Arrays.

### **Unit 5: Functions**

**LH 5**

Declaring and Calling Functions, Passing Arguments to Functions, Returning Values from Functions, Understanding Variable Scope.

### **Unit 6: Making Web Forms**

**LH 8**

Useful Server Variables, Accessing Form Parameters, Form Processing with Functions, Validating Data, Displaying Default Values, Putting It All Together.

### **Unit 7: Working with Databases**

**LH 12**

Organizing Data in a Database, Connecting to a Database Program, Creating a Table, Putting Data into the Database, Inserting Form Data Safely, Generating Unique IDs, A Complete Data Insertion Form, Retrieving Data from the Database, Changing the Format of Retrieved Rows, Retrieving Form Data Safely, A Complete Data Retrieval Form, MySQL Without PEAR DB.

### **Unit 8: Remembering Users with Cookies and Sessions**

**LH 3**

Working with Cookies, Activating Sessions, Storing and Retrieving Information, Configuring Sessions, Login and User Identification, Why setcookie( ) and session\_start( ) Want to Be at the Top of the Page.

**Unit 9: Handling Dates and Times****LH 2**

Displaying the Date or Time, Parsing a Date or Time, Dates and Times in Forms, Displaying a Calendar.

**Unit 10: Working with Files****LH 4**

Understanding File Permissions, Reading and Writing Entire Files, Reading and Writing Parts of Files, Working with CSV Files, Inspecting File Permissions, Checking for Errors, Sanitizing Externally Supplied Filenames.

**References:**

- David Sklar, "*Learning PHP 5, A Pain-Free Introduction to Building Interactive Web Sites*" O'Reilly Media
- Kevin Tatroe, Peter MacIntyre, Rasmus Lerdorf, "**Programming PHP**", O'Reilly Media
- Robin Nixon, "*Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5*",
- Luke Welling, PHP and MySQL Web Development, Addison-Wesley Professional O'Reilly Media

# IT 220: Database Management System

*Credits: 3*

*Lecture Hours: 48*

## **Course Objective**

The main objective of this module is to provide strong theoretical and practical knowledge of the database management system.

## **Course Description**

Database system, Data Abstraction, Data Models, Database users, Entity-Relation Model, Constraints, E-R Diagrams, Design of E-R Database Schema, Relational Data Model, Structure of Relational Database, Relational Algebra, Fundamental Operations, Additional Operating, Modifying the database, Structured Query Language Data Definition Language, Data manipulation Language, Transaction Control Language, Join Operations, Integrity Constraints, Assertion, Triggers, Relational database design issues, Normalization, Transaction Management, Database System Architectures.

## **Course Details**

### **Unit 1: Introduction – Database Management Systems**

**LH 4**

Purpose of Database Systems. Data Abstraction. Data Models: The E-R Model, The Object-Oriented Model, The Relational Model, The Network Model, The Hierarchical Model, Physical Data Models. Instances and Schemes. Data Independence. Database Administrator. Database Users. Application Architecture (One tier, two tier and n-tire). Overall Database System Structure and Components.

### **Unit 2: Entity-Relationship Model**

**LH 8**

Entities and Entity Sets. Relationships and Relationship Sets. Attributes. Mapping Constraints. Keys (Super key, Candidate key and Primary key): Primary Keys for Entity Sets and Relationship Sets. The Entity Relationship Diagram. Reducing E-R Diagrams to Tables: Representation of Strong Entity Sets, Representation of Weak Entity Sets, Representation of Relationship Sets. Generalization and Specialization. Aggregation. Mapping Cardinalities: Representation of Mapping Cardinalities in E-R Diagram. Use of Entity or Relationship Sets. Use of Extended E-R Features. Design of an E-R Database Scheme (Case study).

### **Unit 3: Structured Query Language (SQL)**

**LH 15**

Background, Data Definition Language: Domain Types in SQL, Schema Definition in SQL. Data Manipulation Language: The select Clause, The where Clause, The from Clause, The Rename Operation, Tuple Variables, String Operations, Ordering the Display of Tuples, Duplicate Tuples. Set Operations. Aggregate Functions. Null Values. Nested Subqueries: Set Membership, Set Comparison, Test for Empty Relations, Test for the Absence of Duplicate Tuples. Derived Relations: Views. Modification of the Database: Deletion, Insertion, Updates, Updates, Update of a view. Joined Relations: Join types and Conditions. Embedded SQL. Dynamic SQL. Transaction Control Language (Commit, Rollback).

**Unit 4: Integrity Constraints****LH 5**

Domain Constraints. Referential Integrity: Basic Concepts, Referential Integrity in the E-R Model, Database Modification, Referential Integrity in SQL

**Unit 5: Relational Database Design****LH 6**

Pitfalls in Relational DB Design. Representation of Information: Anomalies. Functional Dependencies: Basic Concepts, Closure of a Set of Functional Dependencies, Closure of Attribute Sets. Decomposition: Lossless-Join Decomposition, Dependency Preservation. Normalization: First Normal Form, Second Normal Form, Third Normal Form, Boyce-Codd Normal Form, Comparison of BCNF and 3NF.

**Unit 6: Transaction Management****LH 5**

ACID Properties. Transaction States: Implementation of Atomicity and Durability, Serializability, Basic Concept of Concurrency Control and Recovery, Locking Protocols, Time Stamp Based Protocol.

**Unit 7: Case Study****LH 5**

MSSQL server, ORACLE, MYSQL

Note:

- The students are required to undertake a project work. The project work can be done individually or in group (at most 4-5 students). The format of the project report is as follows:
  - Project Description
  - Description of entities or object considered in the project
  - Algorithm or Diagram showing description of project
  - Conclusion of the project

The project report should be original, and the reproduction of others' work is strictly prohibited. Number of pages of the report should be at least 4.

**References:**

Abraham Silberchatz, Henry F. Korth, S. Sudarshan; *Database System Concepts*, McGraw Hill 4<sup>th</sup> ed.

Date, C.J.; *An Introduction to Database System*, Addison Wesley, 8<sup>th</sup> ed.

RAMEZ ELMASRI, B. NAVATHE, *Fundamentals of Database System*, Pearson Education Asia, Fifth Edition.

Tribhuvan University  
**Faculty of Management**  
**Office of the Dean**



**Course detail of**  
**BIM (Bachelor of Information Management) 5<sup>th</sup> Semester**

MKT 201: Fundamentals of Marketing	3 Cr. hrs
ECO 202: Macro Economics	3 Cr. hrs
IT 221: Computer Graphics	3 Cr. hrs
IT 222: Java Programming – II	3 Cr. hrs
IT 223: Advance Internetworking	3 Cr. hrs

2015

# MKT 201: Fundamentals of Marketing

*Credits: 3*

*Lecture Hours: 48*

## **Course Objectives**

This course aims to build students' understanding of the marketing process and principles and inculcate basic skills to analyze marketing decision situations.

## **Course Description**

This foundation course on marketing deals on the operation of the marketing functions in a dynamic and competitive environment. It deals comprehensively on issues of emerging marketing practices and challenges. The course includes topics that help students to understand marketing process and environment, information systems and buyer behavior, segmentation, targeting, and positioning strategies, and strategies related to marketing mix variables.

## **Course Details**

### **Unit 1: Introduction**

**LH 6**

Meaning of marketing. Evolution of the marketing philosophies - Basic principles of the production, product, selling, marketing, and holistic marketing concepts. Meaning and tasks of marketing management. Marketing challenges of the 21<sup>st</sup> century and firms' responses to the challenges. Concept, relevance and practices of relationship marketing, green marketing, and e-marketing. Components of the marketing mix for products and services.

### **Unit 2: Marketing Environment**

**LH 4**

Meaning and scope of marketing environment; Micro environment variables, and Macro environment variables; Reactive and proactive marketing. Marketing environment in Nepal.

### **Unit 3: Marketing Information System and Buyer Behavior**

**LH 4**

Concept and relevance of information in marketing decisions. Components of the marketing information system. Marketing research areas and process.

### **Unit 4: Buyer Behavior**

**LH 6**

Organizational buyer behavior – Buying process and influencing factors. Consumer behavior – buying process and influencing factors. Global consumer movements and consumer protection.

### **Unit 5: Segmentation, Targeting and Positioning Strategies**

**LH 4**

Concept, process, requirements, and levels of market segmentation. Bases for segmenting consumer and organizational markets. Segment evaluation, analysis and selection. Concept and types of positioning; product positioning process.

### **Unit 6: Product Decisions**

**LH 8**

Concept and levels of the product. Product classifications and marketing considerations. Product life cycle stages and strategies. New product development process. Branding strategies – branding objectives, types of brand, and concept of brand equity. Packaging: functions and levels of packaging; essentials of a good package. Product line and mix strategies. Service product strategies - service marketing concept, characteristics of services and marketing strategies; management of people, physical evidences, and process.

### **Unit 7: Pricing Decisions**

**LH 6**

Concept of price and pricing. Importance of pricing for the firm and the economy. Internal and external price factors. Pricing approaches-cost-based, demand-based, value-based and competition-based approaches. New product pricing decisions. Price lining and price adjustment decisions. Initiating and responding to price changes.

**Unit 8: Distribution Decisions****LH 4**

Concept and objectives of distribution. Channel functions and flows. Channel designs for consumer and industrial products. Channel selection factors. Channel conflicts and their resolution. Concept, nature and objectives of marketing logistics. Major logistics functions -transportation, warehousing, inventory management, order processing, and customer services decisions.

**Unit 9: Promotion Decisions****LH 6**

Concept and objectives of promotion. Marketing communication process and systems. Promotion mix components. Promotion mix determination factors. Advertising: Nature and objectives. Nature and relevance of personal selling. Nature and objectives of sales promotions. Sales promotion tools and techniques. Nature, objectives and tools of public relations. Concept, relevance and methods of direct marketing.

**Basic Texts**

Kotler, Philip, Gary Armstrong, Prafulla Agnihotri and Ehsan ul Haque. *Principles of Marketing: South Asian Perspective*. Prentice Hall of India, New Delhi, India.

Baines, Paul, Chris Fill and Kelly Page. *Essentials of Marketing*. Oxford University Press, New Delhi, India.

**References**

Koirala, K.D. *Fundamentals of Marketing*, M.K. Publishers and Distributors, Kathmandu, Nepal.

Kamarulzaman, Yusniza and Nor Khalidah Abu. *Principles of Marketing*, Oxford University Press, New Delhi, India.

# ECO 202: Macro Economics

*Credits: 3*

*Lecture Hours: 48*

## **Course Objectives**

This module aims to develop students' understanding of the macroeconomic concepts to enhance their skills in analyzing business environment for decision-making.

## **Course Description**

Macroeconomics: concepts and importance. National income accounting: concepts, measurement approaches and measurement difficulties of national income. Consumption, saving and investment functions, paradox of thrift, acceleration coefficient. Income determination models: classical and Keynesian theories, IS – LM model, concept of multipliers. Business cycles: phases and economic stabilization policy. Inflation: theories of inflation, computation of rate of inflation, Unemployment, macroeconomic policies: monetary policy, fiscal policy. Macroeconomic issues: Nepalese perspective.

## **Course Details**

### **Unit 1: Introduction to Macroeconomics**

**LH 2**

Meaning and scope of macroeconomics, Static and dynamic analysis of Macroeconomics, Macroeconomics and business environment.

*Case Studies*

### **Unit 2: National Income Accounting**

**LH 7**

Circular flow of income and expenditure (two, three and four sector economy), Meaning of national income: Various concepts of NI: GDP, NDP, GNP and NNP (both in – market price and factor cost terms), Nominal GDP, Real GDP and GDP deflator, **Potential and actual GDP**, Personal income, Disposable income and **Saving**, Per capital income. Three approaches of measurement of NI (Product, Income and Expenditure), Measurement Difficulties of NI.

*Numerical assignments and Case studies*

### **Unit 3: Consumption, Saving and Investment**

**LH 8**

- . Meaning, technical attributes and determinants of consumption function
- . Psychological law of consumption function
- . Meaning, Technical attributes and determinants of saving function
- . Paradox of thrift
- . Meaning and types of investment
- . Concept of MEC and investment demand curve
- . Determinants of induced investment
- . Principle of acceleration coefficient (Tabular explanation)

*Numerical assignments and case studies*

### **Unit 4: Theories of National Income Determination**

**LH 12**

Classical Theory of output and Employment

Keynesian Model of Income Determination

- . Income determination in a Two sector economy, change in aggregate demand and investment multiplier
- . Income determination in a Threesector economy, fiscal multipliers (tax multiplier, government expenditure multiplier and balanced budget multiplier)
- . Income determination in a Four sector Economy, foreign trade multiplier IS – LM Model of Income Determination

- . Derivation of IS curve and product market equilibrium
- . Derivation of LM curve and money market equilibrium
- . Determination of equilibrium income
- . Shift in IS curve and effect on equilibrium income
- . Shift in LM curve and effect on equilibrium income
- . Shift in IS and LM curves and simultaneous effect on equilibrium income
- . Monetary policy and effect on equilibrium income
- . Fiscal Policy and effect on equilibrium income
- . Monetary– Fiscal Policies mix and effect on equilibrium income

***Numerical assignments and Case studies***

**Unit 5: Inflation, Unemployment and Business cycles**

**LH 7**

**Inflation:** Meaning, types (on the basis of rate and control), Theories of inflation – Demand-pull and cost-push, Effects (production and distribution of income and wealth), Computation of rate of inflation (Using PPI, CPI and GDP inflator only), Meaning of Deflation and stagflation  
**Unemployment:** Meaning and types, costs of unemployment, Inflation and unemployment

**Business cycles:** Meaning and characteristics, Phases of business cycles, Economic stabilization policy.

***Numerical assignments and Case studies***

**Unit 6: Macroeconomics Policies**

**LH 5**

**Macroeconomic Policy:** Meaning and Objectives

**Money Supply:** Meaning and sources

**Monetary policy:** Meaning, types, instruments, indicators, targets, goals.

**Fiscal Policy:** Meaning, methods, instruments, goals

**Deficit Financing:** Meaning and significance

**Budget:** Meaning and components

***Case studies***

**Unit 7: Macroeconomics Issues: Nepalese Perspective**

**LH 7**

**Balance of Payments :** Meaning and components

**Exchange rate:** Meaning and types, exchange rate determination (demand supply approach)  
 Economic growth and development, Sources of economic growth, Privatisation, economic liberalisation and globalization, market failure, Foreign direct investment Foreign employment: current status and role.

***Case studies***

### ***References***

- Bernake and Abel , ***Macroeconomics***, Singapore, Pearson Education latest edition Froyen, R.T. ***Macroeconomics and Policies*** (8th edition)
- Lipsey, R.S. and C. Harbury, ***Elementary Macroeconomics***, New York, Oxford University Press latest edition
- Mankiew, NG (1998), ***Principles of Macroeconomics***, Orlando, The Dryden Press, Harcourt Brace College Publishers
- McConnell and Brue, ***Economics : Principles, Problems and Policies***, New York, McGraw Hill. Latest edition
- Shrestha, R.G. and Adhikari, G.M. ***Macroeconomics***, fifth edition
- Todaro, M.P ***Economics in the Third World***, Hyderabad, Orient Longman, Ltd. Latest edition
- Other suggested readings: Various Publications and Journals of Nepal Rastra Bank, Ministry of Finance, National Planning Commission, Central Bureau of Statistics, World bank, Central Department of Economics (TU) and So on.

# IT 221: Computer Graphics

*Credits: 3*

*Lecture Hours: 48*

## **Course Objective**

This module aims to develop students' skill in computer graphics. This module should be supported by laboratory experiments to augment the concepts taught in the class.

## **Course Description**

Introduction of Computer Graphics, Hardware and Software Concept, Two Dimensional Algorithm, Three Dimensional Graph, Visible surface detection method, Illumination models and surface rendering methods, and Trends in Computer Graphics, Areas, Text and Colors

## **Course Details**

### **Unit 1: Introduction of Computer Graphics** **LH 2**

- 1.1 Early History
- 1.2 Application of Computer Graphics

### **Unit 2: Hardware and Software Concept** **LH 9**

- 1.3 Input Devices
  - Mouse, Touch Screen, Light Pen, Data Glove, Tablet (Digitizer), Bar Code Reader
- 1.4 Output Devices
  - 1.4.1 Monochromatic & Color CRT
  - 1.4.2 Raster and Random Scan Display
  - 1.4.3 Flat Panel Display
    - 1.4.3.1 LED
    - 1.4.3.2 LCD
  - 1.4.4 Simple Architecture on Raster, Random Scan System
  - 1.4.5 Concept of Three Dimension viewing devices
- 1.5 Graphics Software
  - 1.5.1 Software standards
  - 1.5.2 Need of machine independent graphics language
- 1.6 Color Models
  - 1.6.1 RGB
  - 1.6.2 HSV
  - 1.6.3 Conversion between HSV and RGB color models

### **Unit 3: Two Dimensional Algorithm** **LH 16**

- 1.7 Line Drawing Algorithm

- 1.7.1 DDA (With positive and negative slope)
- 1.7.2 Bresenham's Line Algorithm
  - 1.7.2.1 for positive slope ( $m \leq 1$ ,  $m > 1$ )
  - 1.7.2.2 for negative slope ( $m \leq 1$ ,  $m > 1$ )
- 1.8 Different Line Styles with Java 2D
- 1.9 Drawing Thick Lines with Java 2D
- 1.10 Circle Algorithm
  - 1.10.1 General circle equation
  - 1.10.2 Mid-Point circle equation
- 1.11 2D Geometric Transformation
  - 1.11.1 Basic Transformation
    - 1.11.1.1 Translation
    - 1.11.1.2 Rotation
    - 1.11.1.3 Scaling
  - 1.11.2 Homogenous Coordinate
  - 1.11.3 Composite Transformation
    - 1.11.3.1 Successive Translation
    - 1.11.3.2 Successive Rotation
    - 1.11.3.3 Successive Scaling
    - 1.11.3.4 Pivot point rotation
    - 1.11.3.5 Fixed point scaling
  - 1.11.4 Other Transformation
    - 1.11.4.1 Reflection
    - 1.11.4.2 Shear
- 1.12 Two Dimensional Viewing
  - 1.12.1 Viewing pipeline
  - 1.12.2 Window to viewport coordinate transformation
  - 1.12.3 Clipping
    - 1.12.3.1 Introduction and application of clipping
    - 1.12.3.2 Line Clipping
      - 1.12.3.2.1 Cohen Sutherland line clipping
    - 1.12.3.3 Polygon clipping
      - 1.12.3.3.1 Sutherland Hodgeman polygon clipping

#### **Unit 4: Three Dimensional Graph**

**LH 8**

- 1.13 3D object representation
  - 1.13.1 Polygon surface
  - 1.13.2 Polygon tables
  - 1.13.3 Plane equations
  - 1.13.4 Polygon meshes
- 1.14 Projections
  - 1.14.1 Parallel Projections
    - 1.14.1.1 Isometric

- 1.14.1.2 Oblique
- 1.14.2 Perspectives Projections
- 1.14.3 Derivation of projections
- 1.15 3D Transformations
  - 1.15.1 Translation
  - 1.15.2 Rotation
    - 1.15.2.1 General 3D rotation
    - 1.15.2.2 Geometric transformations in Java 3D
  - 1.15.3 Scaling
    - 1.15.3.1 Fixed point scaling
  - 1.15.4 Reflection
  - 1.15.5 Shear

**Unit 5: Visible surface detection method**

**LH 5**

- 1.16 classification of algorithm
- 1.17 different types of algorithm
  - 1.17.1 depth buffer (z-buffer) method
  - 1.17.2 A-Buffer method
  - 1.17.3 Scan line method
  - 1.17.4 Depth sorting method (Painter's Algorithm)
  - 1.17.5 Clipping in Java 3D

**Unit 6: Illumination models and surface rendering methods**

**LH 6**

- 1.18 light source
- 1.19 basic illumination models
  - 1.19.1 Ambient light
  - 1.19.2 Diffuse reflection
  - 1.19.3 Specular reflection and Phong model
  - 1.19.4 Intensity attenuation
  - 1.19.5 Color consideration
  - 1.19.6 Transparency
  - 1.19.7 Transparency in Java 3D
  - 1.19.8 Shadows
- 1.20 Polygon rendering methods
  - 1.20.1 Constant intensity shading
  - 1.20.2 Light sources in java 3D
  - 1.20.3 Gouraud shading
  - 1.20.4 Phong Shading
  - 1.20.5 Shading in Java 3D
  - 1.20.6 Constant and Gouraud Shading in Java 3D

## **Unit 7: Trends in Computer Graphics**

**LH 2**

- 1.21 Concept of Virtual reality & simulation
- 1.22 Computer animation
  - 1.22.1 Design of animation sequences
  - 1.22.2 Computer animation languages
  - 1.22.3 Morphing and simulating accelerations.
  - 1.22.4 Animation in Java 3D
    - Projections in Java 3D

## **Unit 8: Areas, Text and Colors**

- 1.23 Filling Areas
- 1.24 Buffered Images in Java 2D
  - 1.24.1 Double Buffering in Java 2d
  - 1.24.2 Loading and Saving of Images with Java 2D
  - 1.24.3 Textures in Java 2D
- 1.25 Displaying Text
- 1.26 Text in Java 2D
- 1.27 Grey Images and Intensities
- 1.28 Color models
  - 1.28.1 Colors in Java 2D
  - 1.28.2 Color interpolation
  - 1.28.3 Color interpolation with Java 2D

## **Laboratory Work**

Lab1: DDA

Lab2: Bresenhams line drawing algorithm

Lab3: Circle

Lab4: Basic transformation on 2D

- ✓ Translation
- ✓ Rotation
  - About origin
  - About pivot point
- ✓ Scaling
  - About origin
  - About fixed point

Lab5: Simple 3D Object

Lab6: Basic Transformation on 3D object

- ✓ Translation
- ✓ Rotation
- ✓ Scaling

Laboratory work will be carried out using visual or non visual high level languages.

## **References**

- *Computer Graphics, C Versions* (Prentice Hall) : Hearne and Baker
- *Computer Graphics – Principles and Practices*: J.D. Foley, S.K. Feiner and J.F. Hughes
- *Computer Graphics: Principles and Practice*, 2nd Edition (3rd would be released around mid 2013) - the book you've mentioned is also called *The Bible of CG*
- *Fundamentals of Computer Graphics*, 3rd Edition
- *Computer Graphics using OpenGL*, 2nd or 3rd Edition\*
- *Interactive Computer Graphics: A Top-Down Approach with Shader-Based OpenGL*, 6th Edition\*
- *3D Computer Graphics: A Mathematical Introduction with OpenGL*\*
- *Introduction of Computer Graphics: Using Java 2D and 3D*, Frank Klawonn, Second Edition, Springer
- *Digital Image Processing: An algorithmic Introduction using Java*, Wilhelm Burger, Mark, J. Burge, First edition, Springer
- *Fundamentals of Computer Graphics*, Peter Shirley, Michael Ashikhmin, Steve Marschner, Third edition, A K Peters/CRC Press

# IT 222: Java Programming – II

*Credits: 3*

*Lecture Hours: 48*

## **Course Objectives:**

This course aims to develop students with knowledge with advanced features of java. Basic knowledge of programming in Java is expected from students. This course should be associated with laboratory experiments to augment the concepts taught in the class.

## **Course Description**

The Applet Class, Even handling, Introducing the AWT, Using AWT controls, Layout Managers, and Menus, Introducing Swing, Enterprise Application Architectures, JDBC, XML and Java, Servlet Programming, JSP Programming

## **Course Details**

### **Unit 1: The Applet Class**

**LH 3**

- Two types of applets
- Applet basics
- An applet skeleton
- The HTML applet tag
- Passing parameters to applets

### **Unit 2: Even handling**

**LH 6**

- Two event handling mechanisms
- The delegation event model: events, event sources, event listeners
- The KeyEvent class: MouseEvent Class, TextEvent class, WindowEvent class
- Sources of Events
- Event Listener Interfaces
  - ActionListener, KeyListener, MouseListener, WindowListener, ContainerListene
- Using Delegation event model
  - Handling mouse events, handling keyboard events
- Adapter classes, inner classes

### **Unit 3: Introducing the AWT:**

**LH 3**

- AWT classes
- Window fundamentals: component, container, panel, window, frame, console
- Working with frame windows: setting windows dimensions, hiding and showing and closing windows
- Creating a frame window in an applet

#### **Unit 4: Using AWT controls, Layout Managers, and Menus**

**LH 6**

- Control Fundamentals: adding and removing controls, responding to controls,
- Labels, buttons, checkboxes, choice, lists, scroll bars, textfield, textarea,
- Understanding Layout managers: FlowLayout, BorderLayout, GridLayout, CardLayout, GridBadLayout
- Menus Bars and Menus, Dialog boxes, FileDialog boxes

#### **Unit 5: Introducing Swing**

**LH 5**

- The origins of swing, swing is built on the AWT
- Two Key Swing Features
- The MVC connection
- Components and containers

#### **Unit 6: Exploring Swing:**

**LH 2**

- JLabel and ImageIcon, JTextField, JButtons, JToggleButton, checkboxes, radio buttons, JTabbedPane, JList, JComboBox, JTable,

After completion of above two units program with following should be developed:

- ✓ User Interface with form validation feature,
- ✓ User interface with different look and feel

#### **Unit 7: Enterprise Application Architectures**

**LH 2**

- 2-Tier Architecture, 3- Tier
- Enterprise Architecture
  - J2EE Application Servers

#### **Unit 8: JDBC**

**LH 7**

- Introduction
- Database Basics
  - Structured Query Language
    - Creating a Table – Inserting, Updating, Deleting records
    - JDBC-ODBC bridge
    - Reading Data
    - PreparedStatement, connection pooling

After completion of above two units programs like following should be developed:

- ✓ Program with User Interface and backend to store data, retrieve required data, manipulate/delete mentioned data
- ✓ Simple programs like record keeping system (employee records, student records etc) with manipulation and search facilities should be developed

### **Unit 9: XML and Java**

**LH 2**

- What is XML? What is an XML Document? Why XML?
- Document Type Definition
- XML Schema
- XML parsing – SAX and DOM

### **Unit 10: Servlet Programming**

**LH 6**

- HTTP
  - GET, POST Request
  - Server Side of the Web Application
    - Web Container, Structure of a web application
    - Servlet Technology- Servlet
    - Deployment Descriptor
    - Steps for writing a servlet, servlet initialization, reading HTML form data,
    - Session Management - Creating session, Storing data in session, reading the data from session
    - Request dispatching – The forward() method, the include() method

### **Unit 11: JSP programming**

**LH 6**

- JSP Basics, JSP Directives Declarations
- Implicit Objects
- Java Beans in JSP – jsp:useBean, jsp:setProperty, jsp:getProperty

#### **After completion of above two units**

- ✓ **Web based applications should be developed**
- ✓ **Programs like online data entry form, with search and manipulation capability**

#### **References:**

**Kosuri Phani, Java & J2EE Made Easy, Lulu Publications; 1 edition (September 25, 2012)**

# IT 223: Advance Internetworking

## Course Objectives

This course aims is to focus on network communication protocol.It alsoexplains the motivation of networks and provides in-depth discussion on the challenges in designing such networks from transmission system and network point of views. Further to illustrate these principles and get hands- on experience the course contains a set of lab assignments and a project.

## Course Description

This course contains overview of internet network, networking layer, dynamic routing, Multicast and Multicast routing, Multimedia networking, Peer to Peer network and New Transport Layer protocols

## Course Details

### Unit 1: Overview of Internet and network

LH 2

Networking, Types of networking, Internet  
Seven Layers Function of OSI Model  
Overview of TCP/IP model

### Unit 2: Network layer

LH 4

Network layer service  
Connection oriented services,  
Connection less services  
Connection oriented protocols  
Virtual Circuits (VC), VC forwarding table, VC signaling protocols  
Connection less protocols  
Issues in IP, Next hop Routing, Internet Routing tables, Longest prefix matching,  
IP router model, IP Forwarding, IP header in detail, Fragmentation-MTU, ICMP,  
ICMP error reporting, ICMP error restrictions  
Router Architecture Overview  
Input port functions, Type of switching fabrics (memory, bus, crossbar) in detail  
Output ports, Output port queuing, Input port queuing

### Unit 3: Dynamic Routing

LH 8

Basic routing  
Levels of abstraction  
Partitioning: AS and areas  
Autonomous systems- RFC1930  
Simple internet architecture  
Reachability and metrics  
IP aggregation  
Redistribution of routing information  
Load balancing  
Popular routing protocols  
Distance vector

- RIP(Routing Information Protocol),
- RIP problem (count to infinity),
- Solution (Triggered Update, split horizon, poison reserve, and hold down))
- Disadvantage with RIP.
- Link State Protocols
  - Dijkstra algorithm (shortest path first)
  - Overview of OSPF
  - OSPF Network Topology
  - OSPF protocols (hello, exchange, flooding)
  - Distribution of link state advertisement
  - IS-IS
- Path vector
  - Overview of path vector
  - BGP (overview and architecture)
  - BGP router model

#### **Unit 4: Multicast and Multicast routing**

**LH5**

- IP multicast application
- IP multicast: abstraction of hardware multicast
- IP multicast service model
- IP multicast addresses
- Link-level/hardware multicast
- Mapping IP multicast to Ethernet
- IGMP
  - Position of IGMP in TCP/IP
  - IGMP V2 message
  - Dynamics of IGMP message
  - IGMP V3 overview
- Multicast router
- Multicast routing overview
  - Multicast VS multiple unicast
  - Delivery tree
- Multicast routing protocol
  - Source-Based tree (DVMRP (overview, Reverse Path Multicasting, Reverse Path forwarding), MOSPF, PIM-DM)
  - Group shared tree (PIM-SM, CBT)

#### **Unit 5: IPv6**

**LH 7**

- Overview of IPv4 (Addressing schemes IPV4)
- Issues with IPv4
- Overview of IPv6
- IPv6 Simplification
- IPv6 Header
- IPv6 Addresses (IPv6 format)
- IPv6 Addresses abbreviations and CIDR
- IPv6 Vs IPv4
- Transition from IPv4 to IPv6
  - Transition strategies (Dual stack, tunneling, header Translation)

## **Unit 6: IPQOS**

**LH 6**

- Congestion control algorithm
  - General Principles of congestion control, Congestion prevention policies, Congestion control in virtual circuit subnet (TCP), Congestion control in datagram subnet (UDP).
- QoS Concept
  - QoS parameters (Delay, Bandwidth, Jitter, and Reliability)
- Techniques to achieve good QoS
  - Overprovisioning, Buffering, Traffic shaping, Leaky bucket algorithm, Token bucket algorithm, Admission control, Resource reservation (RSVP)
- Functions of IPQOS (classification, policing, shaping, scheduling, admission control)
- Integrated and differentiate service
- Traffic conditioning (classifier, meter, marker, shaper/dropper)

## **Unit 7: Multimedia networking**

**LH 5**

- Multimedia applications
- Multimedia service requirement
- Classes of multimedia application
  - Streaming stored audio\video
  - Streaming live audio\video
  - Real-time interactive audio\video
- Server for stored streaming audio\video
  - Multimedia for web server
  - Multimedia for streaming server
- Real-time streaming protocol (RTSP)
  - RSTP client server interaction
  - Real-time traffic
  - Delay Jitter
  - Playback buffer
- Real-time transfer protocol (RTP)
- Content distribution networks (CDN)
  - Finding base server

## **Unit 8: Peer to Peer network**

**LH 4**

- Client/server architecture
- Peer to peer architecture
- Client/server VS peer to peer network
- History and examples of P2P
  - File sharing: -FTP, IRC, Napster, Gnutella/KaZaa/direct connect, BitTorrent
  - Non file sharing: - Skype, DNS, USENET
- P2P – peer discovering
  - Centralized, fully distributed, Hierarchical (Gossiping, Distributed Hash Tables, Super Peers)
- P2P operation
- P2P and Infrastructural

## Unit 9: New Transport Layer protocols

LH 4

Process to process Communication

Functions (addressing, ordered/unordered delivery, error control, flow control, congestion control, segment fragmentation/reassembly)

Advances in transport layer

DCCP (datagram congestion control protocol)

Congestion control in DCCP

UDP vs. DCCP

SCTP (stream control transmission protocol)

SCTP packet

SCTP association and multi homing

Implementation of Multi streaming in SCTP

LAB:-

- 1) Setting up Routers,
- 2) Dynamic IP Address assignment
- 3) Static and dynamic Routing
- 4) IPv6
- 5) Multicast routing
- 6) Multimedia networking

Project: - At the end of the semester students will work together in groups of 5 or 6 in a project to learn about and demonstrate how to setup an ISP(internet service provider). This project has to be examined by external examiner.

- ISP Requirements report: Each group should submit a report on services and functionality required to establish an ISP. The group should also comment upon the requirements report submitted by another group.
- Final report and demonstration: A final report should be written to describe some of the most desirable services an ISP should provide, including descriptions of how to this could be implemented. Some of the services should also be implemented and demonstrated by the group.

### Course Book:

- J.F. Kurose, K.W. Ross: Computer Networking: A Top Down Approach

### References

- B. A. Forouzan: Data Communication and Networks
- A.S Tanenbaum: Computer Networks. 4<sup>th</sup> Edition. PHI.
- D.E. Corner: Internetworking with TCP/IP. Vol.1. 3<sup>rd</sup> ed. PHI.
- S. Keshav: An Engineering Approach to Computer Networking Addison Wesley, Longman.
- W. Stalling: Data and Computer Communications. 8<sup>th</sup> Edition. PHI.
- W.R. Stevens: TCP/IP Illustrated Volume I, II and III, Addison Wesley Longman

Tribhuvan University  
**Faculty of Management**  
**Office of the Dean**



**Course detail of**  
**BIM (Bachelor of Information Management) 6<sup>th</sup> Semester**

FIN 201: Business Finance	3 Cr. hrs
MGT 202: Human Resource Management	3 Cr. hrs
MGT 206: Business Environment in Nepal	3 Cr. hrs
IT 224: Software Engineering	3 Cr. hrs
IT 225: Computer Security and Cyber Law	3 Cr. hrs
IT 351: Summer Project	3 Cr. hrs

**2016**

# FIN 201: Business Finance

*Credits: 3*

*Lecture Hours: 48*

## **Course Objective**

The basic objective of this course is to impart basic knowledge and required skills of business finance to students to understand the nature and functions of finance and to professionally use the knowledge to analyze financial issues and take appropriate financial decisions and actions thereto.

## **Course Description**

The course deals with nature of finance functions, financial statement and cash flow analysis, time value of money, risk and return, bond and stock valuation, capital budgeting analysis, and working capital management.

## **Course Details**

### **Unit 1: Introduction**

**LH 3**

Nature of business finance and role of a financial manager; Goals of the firm; Finance functions; The agency problem; Financial markets and the firm.463

### **Unit 2: Financial Statements, Taxes, Cash Flow and Analysis**

**LH 5**

Nature of financial statements; The balance sheet; The income statement; Cash flow; Common size statements; Ratio analysis; The Du Pont identity; Using financial statement information

### **Unit 3: The Time Value of Money**

**LH 6**

Concept of the time value of money; Future value and compounding – single and multiple periods; Present value and discounting – single and multiple periods; Present value vs. future value – multiple cash flows; Finding number of periods; Loan amortization

### **Unit 4: Risk and Return**

**LH 7**

Nature of risk and return; Expected returns and variances; portfolio analysis; Risk – systematic and unsystematic; Diversification and portfolio risk; Systematic risk and beta; The security market line; The SML and the cost of capital.

### **Unit 5: Bond Valuation and Interest Rates**

**LH 5**

Bonds and bonds valuation; Bond ratings; Types of bonds; Bond markets; Inflation and interest rates; Determinants of bond yields.

### **Unit 6: Stock Valuation**

**LH 7**

Features of common and preferred stocks; Common stock valuation – zero growth, constant growth, nonconstant growth and two stage growth; The stock markets – dealers and brokers, organization of stock exchange

### **Unit 7: Capital Budgeting Analysis**

**LH 8**

Nature of capital expenditures; Significance of capital budgeting; Techniques of capital budgeting and decision rule – payback rule, average accounting return, internal rate of return and profitability analysis; Estimates of project cash flows; Role of depreciation; Evaluating NPV estimates; Replacement problems.

### **Unit 8: Working Capital Management**

**LH 7**

Nature and objectives of working capital management; Cash management – objectives of cash management and cash budget; Receivables management – credit policy, credit period, cash discount and analyzing credit policy; Inventory management – nature of inventory, objectives of inventory management, economic order quantity and quantity discounts.

**Basic Textbook:**

Stephen A. Ross, Randolph W. Westerfield and Bradford D. Jordan. *Fundamentals of Corporate Finance*. New Delhi: Tata McGraw Hill Education Pvt. Ltd.

**Reference Books:**

James C. Van Horne and John M. Wachowicz, Jr. *Fundamentals of Financial Management*. New Delhi: Prentice-Hall Limited.

Eugene F. Brigham and Joel F. Houston. *Fundamentals of Financial Management*. Singapore: Thomson, South-Western.

# MGT 202: Human Resource Management

*Credits: 3*  
*Lecture Hours: 48*

## **Course Objectives**

This course aims to develop student's understanding of the basic concepts, practices and approaches of human resource management.

## **Course Description**

This course contains introduction, human resource planning, job analysis and design, recruitment and selection, training and development, performance appraisal, rewards management, Career development, employee grievances and disciplines, labour relations and labour Act of Nepal.

## **Course Details**

### **Unit 1: Introduction**

**LH 6**

Concept, characteristics, objectives, and components of HRM. HRM and Personal management, HRM environment (globalization, technological advances, nature of work, workforce diversity, and legal trends). Contemporary HR issues, challenges and responsibilities of HR manager.

### **Unit 2: Human Resource Planning**

**LH 7**

Concept, characteristics, and importance. HRP process. Major HRP activities: assessment of current HR (HR inventory – management inventory and skills inventory, HR information system, and succession planning), HR demand and supply forecasting. Techniques of HR demand and supply forecasting.

### **Unit 3: Job Analysis and Design**

**LH 6**

Job analysis: concept and terminology (task, job, position and occupation). Purpose and methods of collecting job analysis information. Job analysis Technique. Job description and job specification. Job design: concept, approaches and techniques (scientific management, Herzberg's model, job characteristics, socio-technical, and team).

### **Unit 4: Employee Recruitment and Selection**

**LH 5**

Recruitment: concept and sources. Selection: concept, and importance. Selection Process. Selection tests and interviews: concept and types. Recruitment and selection practices in Nepalese organization.

### **Unit 5: Training and Development**

**LH 7**

Concept and needs of HR training and development. Training needs assessment. HR training: objectives and methods (on-the-job and off-the-job). Evaluation of training program. Management development: concept, objectives, and methods (on-the-job and off-the-job). Career planning and development, Mentoring and counseling; Training and development practices in Nepalese organizations.

### **Unit 7: Performance Appraisal**

**LH 5**

Concept, uses and methods (simple ranking, alternative ranking, paired comparison, forced distribution, critical incident, behaviorally anchored rating scale). Appraisal interview. MBO approach to appraisal. Problems in performance appraisal.

### **Unit 8: Rewards Management**

**LH 3**

Concept and types (intrinsic and extrinsic, financial and non-financial). Qualities of effective rewards, Types of employee benefits, practices of pay determination in Nepal.

**Unit 9: Employee Grievances and Disciplines****LH 3**

Employee grievances: concept and handling grievances. Employee discipline: concept, causes, and process of managing discipline. grievances handling practices in Nepalese organizations.

**Unit 10: Labor Relations and Labour Regulations in Nepal****LH 6**

Labor relations: concept, objectives, and actors of labor relations. Reasons for joining trade unions. Trade unionism: concept, functions and types. Collective bargaining: concept and process, Labor disputes: causes and settlement provisions. Features and provisions of Labour Act.

**Addendum:** At least one case will be administered at the end of each chapter. The students will also complete a project work and a few other assignments as specified by the faculty member.

***References***

Armstrong, M., *A Handbook of Human Resource Management*, NewDelhi: Aditya Books.

D.A. Decenzo and Robbins S.P., *Human Resources Management*, John Wiley and sons (Asia) Pte. Ltd. Singapore.

D.R. Adhikari, *Fundamentals of Human Resource Management*. Buddha Academic Publishers and Distributors Pvt. Ltd.

Cascio, W., *Managing Human Resources*, McGraw-Hill.

*Labor Act* of Nepal.

# MGT 206: Business Environment in Nepal

*Credits: 3*  
*Lecture Hours: 48*

## **Course Objectives**

This course examines the economic, social, political, and legal interfaces between the business institution (especially the corporation) and the environment. The course intends to provide students with an overview of the environmental forces within which business must operate, and an understanding of some of the analytical tools that managers use to solve business and economic problems. The focus is to enable students to identify, understand and evaluate the environmental forces causing change in business performance and future strategic options.

## **Course Description**

The topics include socio-economic, political-legal, technological, and global business environment, business-government relations, performance of industry and agricultural sectors, and financial sector policy reforms.

## **Course Details**

### **Unit 1: Introduction**

**LH 5**

Business and its environment, types of business environment, environmental analysis – process and techniques, scanning methods, use of environmental analysis in strategic management.

### **Unit 2: Macroeconomic Environment**

**LH 15**

Dimensions of the economy, major problems and challenges facing Nepalese economy, employment trends and labour market issues, migration and foreign employment, economic development plans, industry and agricultural sectors – performance and emerging challenges, economic policies and reforms - industrial policy, privatization policy, trade policy, tourism policy, and monetary policy; liberalization of the Nepalese economy and capital market reforms, factors contributing to competitive business environment in Nepal.

### **Unit 3: Political-Legal Environment**

**LH 9**

Political structure in Nepal, political parties, Nepalese Constitution, Government and its branches, business-government relations, risks involved with Nepalese political environment and the emerging issues, an overview of business legislation in Nepal, legislations relating to labour, finance, investment, intellectual property, e-business, and consumer protection.

### **Unit 4: Socio-cultural Environment**

**LH 5**

Components of socio-cultural environment, family structure and social organizations, class structure and classification, socio-cultural changes and their effects on business.

### **Unit 5: Technology and Energy Management**

**LH 5**

Business and technology, current status of technology, technology transfer issues, IT Policy of Nepal, natural environmental issues, energy situation in Nepal, and environment and energy management issues in Nepal.

**Unit 6: Global Business Environment****LH 9**

Concept of globalization – trends and issues, regional grouping of nations, regional trade agreements in South Asia – SAARC, SAPTA, SAFTA and BIMSTEC, foreign direct investment in Nepal, WTO and Nepal.

**Basic Books**

Pant, Prem R. *Fundamentals of Business Environment in Nepal*, Buddha Academic Enterprises.

Agrawal, Govind. *Dynamics of Nepalese Business Environment*. M. K. Publishers.

Business Legislations and related publications of the Government of Nepal.

# IT 224: Software Engineering

*Credits: 3*

*Lecture Hours: 48*

## **Course Objectives**

This module aims to introduce students with problems in large-scale software production. It should be associated with laboratory experiments to augment the concepts taught in the class.

## **Course Description**

Introduction, software processes, Agile Software development, Requirements Engineering, System modeling, Architectural Design, Design and Implementation, Software testing, Software evolution, Sociotechnical Systems, Dependability and Security, Dependability and Security Specifications

## **Course Details**

### **Unit 1: Introduction**

**LH 3**

- Professional software development
- Software engineering ethics
- Case studies

### **Unit 2: Software processes**

**LH 3**

- Software process models
- Process activities
- Coping with change
- The rational unified process

### **Unit 3: Agile Software development**

**LH 5**

- Agile methods
- Plan-driven and agile development
- Extreme programming
- Agile project management
- Scaling agile methods

### **Unit 4: Requirements engineering**

**LH 5**

- Functional and non-functional requirements
- The software requirements document
- Requirements specification
- Requirements engineering processes
- Requirements elicitation and analysis
- Requirements validation
- Requirements management

### **Unit 5: System modeling**

**LH 4**

- Context models
- Interaction models
- Structural models
- Behavioral models

- Model-driven engineering

<b>Unit 6: Architectural design</b>	<b>LH 5</b>
<ul style="list-style-type: none"> <li>• Architectural design decisions</li> <li>• Architectural views</li> <li>• Architectural patterns</li> <li>• Architectural architectures</li> </ul>	
<b>Unit 7: Design and implementation</b>	<b>LH 6</b>
<ul style="list-style-type: none"> <li>• Object oriented design using the UML</li> <li>• Design patterns</li> <li>• Implementation issues</li> <li>• Open source development</li> </ul>	
<b>Unit 8: Software testing</b>	<b>LH 4</b>
<ul style="list-style-type: none"> <li>• Development testing</li> <li>• Test-driven development</li> <li>• Release testing</li> <li>• User testing</li> </ul>	
<b>Unit 9: Software evolution</b>	<b>LH 3</b>
<ul style="list-style-type: none"> <li>• Evolution processes</li> <li>• Program evolution dynamics</li> <li>• Software maintenance</li> <li>• Legacy system management</li> </ul>	
<b>Unit 10: Sociotechnical systems</b>	<b>LH 3</b>
<ul style="list-style-type: none"> <li>• Complex systems</li> <li>• Systems engineering</li> <li>• System procurement</li> <li>• System development</li> <li>• System operation</li> </ul>	
<b>Unit 11: Dependability and security</b>	<b>LH 3</b>
<ul style="list-style-type: none"> <li>• Dependability properties</li> <li>• Availability and reliability</li> <li>• Safety</li> <li>• Security</li> </ul>	
<b>Unit 12: Dependability and security specifications</b>	<b>LH 4</b>
<ul style="list-style-type: none"> <li>• Risk-driven requirements specification</li> <li>• Safety specification</li> <li>• Reliability specification</li> <li>• Security specification</li> <li>• Formal specification</li> </ul>	

**Text Book**

Software engineering, Ian Sommerville, ninth edition

**References**

A software engineering approach to labVIEW, Jon Conway

Software engineering: A Practitioner's Approach, Roger Pressman

Software Engineering Best Practices: lessons from successful Projects in the top companies, Capers Jones

# IT 225: Computer Security and Cyber Law

*Credits: 3*  
*Lecture Hours: 48*

## **Course Objectives**

This module aims to introduce the fundamental knowledge of computer security and the recent development in the enactment of cyber laws.

## **Course Description**

Introduction to Computer Security, Cryptography and Cryptographic Algorithms, Introduction to Network Security, Digital Signatures and Authentication Protocols, Design Principles and Common Security related programming problems, Malicious Logic and protection, Intrusion Detection System(IDS), Web security and Email Security, Database Security, Policy and Procedures, Issues with Internet in college.

## **Course Details**

### **Unit 1: Introduction to computer security LH 5**

Basic components of security (Confidentiality, Integrity and Availability), Security threats (Snooping, Modification, Masquerading, repudiation of origin, denial of receipt, Delay, Denial of service), Issues with security (Operational issues, human issues), Security Policies, Type of security policy, Access control, Type of access control (Introduction to MAC, DAC, Originator Controlled Access Control, Role Based Access Control) Overview of the Bell-LaPadula Model and Biba integrity model.

### **Unit 2: Cryptography and Cryptographic Algorithms LH 4**

Cryptography, Data Encryption Standard, Symmetric key Cryptography(Block and stream ciphers), Asymmetric key Cryptography, Public key Cryptography (RSA), Message Digest 5, Hash Function, Message Authentication Code (MAC).

### **Unit 3: Introduction to Network Security LH 4**

Fundamentals of Network security, Principal methods of protecting Network (Encryption, Decryption, Encryption in network), Network organization (Firewalls and proxies, Analysis of the network infrastructure), DMZ, Types of Firewalls(Packet Filtering, State-full Packet Filtering Circuit Level Gateway, Application level/proxy), IPSec, VPN.

### **Unit 4: Digital Signature and Authentication Protocols LH 5**

Authentication Basic , Password (Attacking a password system, countering password guessing, Password aging), Challenge Response, Biometrics, Location, Multiple Methods, ,Mutual (Symmetric, Public Key), One-way (Symmetric, Public Key) Digital

Signature, Direct Digital Signature, Arbitrated Digital Signature, Digital Certificate, X.509 Certificate, Authentication Protocols, Authentication Services, Kerberos V4, Digital Signature Standards (DSS) , DSS approach Vs RSA approach.

**Unit 5: Design Principles and Common Security related programming problems** **LH 4**

Eight principles for the design and implementation of security mechanisms, Common Security related programming problems (Improper choice of initial protection domain, Improper Isolation of implementation detail, Improper change, Improper Naming, Improper de-allocation or deletion, Improper validation, Improper indivisibility, Improper Sequencing, Improper choice of operand or operation).

**Unit 6: Malicious programs and Protection** **LH 4**

Computer Viruses and Worms, Rabbits and Bacteria Defenses (Sandboxing, Information flow metrics, reducing the rights, malicious logic altering files, proof carrying code and notion of trust). Antivirus and features.

**Unit 7: Intrusion Detection** **LH 4**

Intruders, Intrusion techniques, Intrusion detection (Anomaly modeling, misuse modeling, specification modeling), Architecture (Agent (Host based information gathering, Network based information gathering, combining sources), Director, Notifier), Organization of intrusion detection system (Monitoring Network traffic for Intrusions(NSM), combining host and network monitoring (DIDS), Autonomous Agents(AAFID)), Intrusion Response (Incident prevention, Intrusion Handling (Containment Phase, Eradication Phase, Follow-up Phase).

**Unit 8: Web security and Email Security** **LH 5**

Web security, Threats, SSL (Architecture, Handshake protocol, Handshake protocol action), overview of TLS and HTTPS, Secure Electronic Transaction overview, Dual Signature, Payment Processing, E-Mail, SMTP, PEM, PGP, Concept of Secure Email.

**Unit 9: Database Security** **LH 5**

Issues regarding the right to access information, system related issues: system levels: physical hardware, Operating system, DBMS level, Multiple security level and categorization of data and users, Loss of integrity, Loss of availability, Loss of confidentiality, Access control, Inference control, flow control, data encryption.

**Unit 10: Policy and Procedures** **LH 3**

Computer Crime and Categories, Cyber Crime, Digital Forensics ( overview of (Digital Evidence, Investigation Procedures, Categories of evidence (Impressions, Bioforensics, Trace evidence, Material evidence)), Intellectual Property Rights, Copyrights, Trademarks, Patents Licenses, Agreements, Plagiarism, Digital rights management,

Privacy protection, Cyber Law, Electronic Transaction Act, Electronics Transaction Rules, IT Policy, Information Security and policies.

### **Unit 11: Issues with Internet in college**

**LH 5**

Cyberbullying: Curbing student use of technology to intimidate and harass others; Student use of the Internet: Reducing inappropriate Internet behaviors; Staff use of the Internet: Drawing a Line between teachers' public and private lives; Privacy and security: Protecting student information; The school as an Internet service provider: Providing access and protecting students; Copyright law in the classroom: steering clear of legal liability; Policies, procedures and contracts: communicating expectations to teachers, students and parents; Ethical Issues: Developing responsible internet citizens

### **References**

Bishop M, Venkatramanayya S. S, Introduction to Computer Security

Stallings W. Cryptography and Network Security

Bishop M, Computer Security Art and Science

Pfleeger C. P., Pfleegar S. L., Security in computing.

Kaufman C., Perlman R., Speciner M.: Network Security: Private Communication in a Public World.

Electronic Transaction Act(ETA), Government of Nepal.

Electronic transaction Rule (ETR), Government of Nepal.

IT policy Of Nepal.

Copyrights Acts, Government of Nepal.

Eoghan Casey Handbook of Digital Forensics and Investigation, Academic Press, 2010, 2e.

Katz J., Lindell Y. Introduction to Modern Cryptography. CRC Press, 2007.

Cyber Law: Maximizing safety and Minimizing risk in classrooms, Aimee M. Bissonette, Worwin

Tribhuvan University  
**Faculty of Management**  
**Office of the Dean**



**Course detail of**  
**BIM (Bachelor of Information Management) 7<sup>th</sup> Semester**

MGT 203: Organizational Behavior	3 Cr. hrs
MGT 205: Operations Management	3 Cr. hrs
MGT 208: Business Strategy	3 Cr. hrs
IT 226: Management Information System	3 Cr. hrs
IT 227: Object Oriented Analysis and Design	3 Cr. hrs
IT 228: Artificial Intelligence	3 Cr. hrs

**2016**

# MGT 203: Organizational Behavior

*Credits: 3*

*Lecture Hours: 48*

## **Course Objectives**

This course aims to provide students with an in-depth understanding of fundamental theories of organizational behavior.

## **Course Description**

The course comprises 10 units- introduction, understanding individual behavior, perception, learning, personality, motivation and job satisfaction, groups and teams in organizations, leadership, communication, conflict and organizational change and development.

## **Course Details**

### **Unit 1: Introduction to Organizational Behavior**

**LH 6**

Concept, Organizational behavior system, basic assumptions, levels of OB analysis, Basic assumptions of OB, Contributing disciplines to the field of OB, challenges for managers.

### **Unit 2: Understanding Individual Behavior**

**LH 5**

Concept, behavior as an input-output system. Mental process-beliefs, attitudes, values, needs, motives and behavior, Sensation, Emotions and Cognitive dissonance.

### **Unit 3: Perception**

**LH 3**

Concept, perceptual process, factors affecting perception, specific application of perception in organizations, theories in organizations, Attribution theory, Attribution errors.

### **Unit 4: Learning**

**LH 3**

Concept of learning, Learning theories, Factors influencing learning, Principles of learning, Behavior modification.

### **Unit 5: Personality**

**LH 5**

Concept, Personality traits and characteristics, Determinants of personality, linking an individual's personality and values to the workplace, Major personality attributes influencing OB, application of personality traits and characteristics at work place.

**Unit 5: Motivation and Job Satisfaction****LH 5**

Concept, Motivation theories-Maslow Hierarchy needs theory, Hygiene factors and motivators theory, ERG motivation theory, McClelland Achievement theory and Vroom expectancy theory. Application of motivation theories, Motivation for Performance, Concept of job satisfaction, Effects of job satisfaction on employees' performance.

**Unit 6: Groups and Teams in Organizations****LH 5**

Concept of group and group dynamics, the dynamics of group formation, types of groups, The dynamics of informal groups, concept and nature of teams, Types of teams, Team processes.

**Unit 7: Leadership****LH 4**

Concept, Effective leadership, Theories of leadership-trait perspective, behavioral theories, contingency theories,

**Unit 8: Communication****LH 4**

Concept, Function and process, System, Types, Communication network, Barriers to effective communication, Overcoming communication barriers, Issues in communication.

**Unit 9: Conflict****LH 3**

Concept, nature, types and nature and types of intergroup conflict, Dynamics of intergroup conflict, Sources of conflict, Approaches to conflict management.

**Unit 10: Organizational Change and Development****LH 5**

Concept, Forces of change, Resistance to change, Approaches to managing organizational change, Concept of organizational development (OD), OD values, OD interventions.

**Text Books**

Robbins, S.P., *Organizational Behavior*, New Delhi: Pearson.

Arnold, H.J. and Fieldman, D.C. *Organizational Behavior*. New York: McGraw Hill Book Company.

Adhikari, D.R. *Organizational Behavior*. Kathmandu: Buddha Academic Enterprises Pvt. Ltd.

Asathappa, K. *Organizational Behavior*. (8th Edition), New Delhi: Himalayan Publishing House.

Dwivedi, R.S. *Human Relations and Organizational Behavior: A Global Perspective*. New Delhi: Macmillan India Limited.

Moorhead, G. and Griffin, R.W. (2000). *Organizational Behavior*. New Delhi: AITBS Publishers.

# MGT 205: Operations Management

*Credits: 3*

*Lecture Hours: 48*

## **Course Objective**

This course aims to impart the basic knowledge, tools and techniques of operations management to students.

## **Course Description**

Introduction to operations management. Operations strategy, Product and service design, Location decision and facility layout, linear programming , Aggregate planning , Inventory management and The quality system.

## **Course Details**

### **Unit 1: Introduction**

**LH 6**

Meaning ,definitions, and objectives; The transformation process; Differences between production and service operations; Scope of operations management; Operations and supporting functions; Role of the operations manager; Production system: Intermittent and continuous; Key issues for operations managers; Historical evolution of operations management; Productivity: concepts, types , factors affecting productivity; Productivity measurement, concept on green productivity; Supply chain management ( concept only).

### **Unit 2: Operations Strategy**

**LH 3**

Introduction to operations strategy; Operations strategy as a competitive weapon; Linkage between corporate, business and operations strategy; Components of operations strategy; Manufacturing strategies; Service strategies.

### **Unit 3: Product and Service Design**

**LH 5**

Concept on product and service design; Product development process; Difference between product and service design; Emerging issues in product and service design; Value analysis, concurrent engineering and quality function deployment; Waiting line theory (Single channel only).

### **Unit 4: Locations decision and Facilities layout**

**LH 5**

Reasons and Importance of location decisions; Factors affecting location decision of service, and manufacturing organizations; Techniques of location analysis: Qualitative and quantitative analysis; Concept on layout; Types of layout: Product layout , process layout , cellular layout , fixed position layout; Designing process layout.

### **Unit 5: Linear programming**

**LH 10**

Introduction to linear programming; Graphical and simplex method; Introduction to duality and sensitivity analysis by using solver; Assignment model (only minimization case); Transportation model (Only minimization case: excluding loop formation).

### **Unit 6: Aggregate planning**

**LH 4**

Concept on aggregate planning; Aggregate planning strategies; Planning options; Aggregate planning in services.

**Unit 7: Inventory Management****LH 4**

Concept and importance; Inventory costs; Dependent and independent demand; Inventory systems- continuous and periodical; Basic EOQ Model (with and without discount); ABC classification.

**Unit 8: The Quality System****LH 8**

Introduction to quality; Historical evolution of Total Quality Management; Definitions of quality; Philosophy, principles and concepts of Total quality management. Costs of quality; Quality Control: Introduction, objectives, advantages; Statistical process control -Control charts- control charts for variable and attributes; JIT and Six Sigma; Quality Management System: ISO 9000 series; 7 tools for the quality.

**Addendum:** At least one case will be administered at the end of each chapter. The students will also complete a project work and a few other assignments as specified by the faculty member.

Class Lecture = 45 hrs.

Tutorials = up to 15 hrs.

Assessment = 3 hrs.

**Reference Books**

Adam and Ebert (2007), *Production and Operations Management*, Fifth Edition, New Delhi: Prentice-Hall of India Private Limited

Bajracharya P., Bajracharya S. and Maharjan B. (2007), *Production and Operations Management*, First Edition, Kathmandu: Quest Publication

Chase, Jacobs, Aquilano and Agrawal (2006), *Operations Management for Competitive advantage*, Eleventh Edition, New Delhi: Tata McGraw-Hill Publishing Company Limited

Dahlgaard Jens. J, Kristensen K and Kanji G.K. (2002), *Fundamentals of Total Quality Management Process analysis and improvement*, London and New York: Taylor and Francis

Gaither and Frazier (2002), *Operations Management*, Ninth Edition, Singapore: Thomson Asia Pte Ltd.

Krajewski and Ritzman (2002), *Operations Management*, Sixth Edition, Delhi: Pearson Education (Singapore) Pte.Ltd

Manandhar, K.D. and Shrestha, K.N. (2000) *Production and Operations Management*, Kathmandu: Valley Publishers

Regmi, Joshi, Chaudhary and Fago (2003), *Production and Operations Management*, Second Edition, Kathmandu: Buddha Academic Enterprises Pvt.Ltd.

Shrestha, S. and Silwal, D. (2000), *Production and Operations Management*, Kathmandu: Taleju Prakashan

Stevenson W.J. (2014). *Operations Management*, Twelfth Edition, New York: McGraw-Hill Education

Sthapit, Yadav, Tamang, Dhital and Adhikari, (2007), *Production and Operations Management*, Second Edition, Kathmandu: Asmita Books Publishers & Distributors

# MGT 208: Business Strategy

*Credits: 3*

*Lecture Hours: 48*

## **Course Objective**

This course aims to develop students' understanding of the strategic management by clearly explaining strategy concepts, analyzing and evaluating them to show how these are applied in the business world.

## **Course Description**

This course contains introduction, vision and mission, objectives and strategy, strategic analysis, strategy formulation, Strategy Implementation.

## **Course Details**

### **Unit 1: Introduction**

**LH 7**

Concept and importance of strategic management, importance of strategic decisions, elements of strategic management, Need for strategy, company values, levels of strategy, strategic management process, changes in the approach to strategic management, different perspectives on strategy formulation, concept and features of strategic planning.

### **Unit 2: Vision and Mission, Objectives and Strategy**

**LH 7**

Developing strategic vision, communicating the strategic vision, crafting a mission statement, linking vision and mission with company values, levels of objectives, crafting objectives.

### **Unit 3: Strategic Analysis**

**LH 12**

Concept, the general environment; scanning, monitoring and forecasting the environment, Scenario planning, PEST analysis; The competitive environment- Porter's Five Forces Framework, the value net, strategic groups, hypercompetition, Internal environment analysis- value-chain-analysis, evaluating Value chain, SWOT analysis; concept of internal environment, the resource-based view of strategy- resources, competencies, core competencies and distinctive capabilities; identifying sustainable competitive advantage, criticism of resource-based view, knowledge management.

### **Unit 4: Strategy Formulation**

**LH 14**

Concept, Business level strategy- Generic competitive strategies, a resource-based view to strategy formulation, the industry life-cycle; corporate level strategies- Growth strategies, related and unrelated diversification, implementing growth strategies, portfolio analysis- Boston Consulting Group Matrix and The General Electric-Mckinsey Matrix, strategy evaluation.

### **Unit 5: Strategy Implementation**

**LH 8**

Concept, organizational structures- the entrepreneurial, functional, divisional, matrix and network, strategic leadership, leadership and management, the learning organization, emotional intelligence and leadership performance, leadership capabilities, impact of leadership on vision, values and culture, corporate culture and leadership, leading strategic change.

**Text and Reference books:**

Henry, E.A. Understanding Strategic Management, Oxford

Jauch, L.R. and Glueck, W.F. Business Policy and Strategic Management, McGraw-Hill.

Pearce II, J.A., Robinson R.B and Mittal, A. Strategic Management: Formulation, Implementation and Control, McGraw Hill.

Thompson, A. Peteraf, M.A., Gamble, J.E., Strickland, A.J., and Jain A.K. Crafting and Executing Strategy, McGraw-Hill

Kajmi, A. Business Policy and Strategic Management, Tata McGraw Hill

Adhikari, D.R. Strategic Management, Buddha Publication

Wheelan, T.L. and Hunger J.D. Strategic Management and Business Policy, Pearson

# IT226: Management Information System

*Credits: 3*

*Lecture Hours: 48*

## **Course Objectives**

This module aims to provide students with a background on the use and advantages of information systems in organizations with a focus on managerial aspects of MIS to promote an awareness of the economic, social, and ethical implications of such systems on society and IT professionals.

## **Course Description**

Foundations of Information Systems in business, Foundation concepts: The components of IS, Competing with Information Technology, Using Information Technology for strategic Advantage, Managing Data Resources, e-business Systems, Supporting Decision Making.

## **Course Details**

### **Unit 1: Foundations of Information Systems (IS) in Business**

**LH 7**

- The real world of information system and information system
- The fundamental Roles of IS in Business
- The role of e-business in business
- Types of Information Systems:
  - Operations support systems
  - Management support systems
  - Other classifications of IS
- Managerial Challenges of Information Technology (IT)
  - Success and Failure with IT
  - Developing IS solutions
  - Challenges and Ethics of IT
  - Challenges of IT careers
  - The IS function

### **Unit 2: Foundation concepts: The components of IS**

**LH 7**

- System concepts: A foundation: System, Feedback and Control
- System characteristics
- Components of ISs
- Information system resources
  - People, hardware, software, data, Network
- Information System Activities
  - Input, Process, Storage of data, Output of Information Products, Control
- Recognizing Information systems

### **Unit 3: Competing with Information Technology**

**LH 7**

- Fundamentals of Strategic Advantage
- Strategic IT
- Competitive Forces and strategies
- Strategic Uses of Information Technology
- Building a customer-focused business

- The value chain and strategic IS
- Value chain examples

#### **Unit 4: Using Information Technology for strategic Advantage**

**LH 7**

- Strategic Uses of IT
- Reengineering Business Processes
- The role of IT
- Becoming an Agile company
- Creating a virtual company
- Building a knowledge-creating company
- Knowledge management systems

#### **Unit 5: Managing Data Resources**

**LH 7**

- Data resource management
- Types of databases: operational, distributed, external, hypermedia databases
- Data warehousing and data mining
- The database management approach
  - Database management system, database interrogation, database maintenance, application development

#### **Unit 6: e-business Systems**

**LH 7**

- Introduction
- Cross-functional enterprise applications
- Enterprise application integration
- Transaction processing systems
  - The transaction processing cycle
- Enterprise collaboration systems: tools for enterprise collaboration
- Functional business systems
  - Introduction, IT in business
  - Marketing systems: interactive marketing, targeted marketing, sales force automation
  - Manufacturing systems: computer-integrated manufacturing
  - Human resource systems: HRM and Internet, HRM and corporate Intranets
  - Accounting Systems: online Accounting systems
  - Financial management systems

#### **Unit 7: Supporting Decision Making**

**LH 6**

- Decision support in business
- Information, decisions, and management
- Information quality
- Decision structure, decision support trends, decision support systems
- Online analytical processing: OLAP examples
- Using decision support systems: what-if analysis, sensitivity analysis, goal-seeking analysis, optimization analysis, data mining for decision support

**Text books**

Management Information systems, James A O'brien, George M Marakas, Ramesh Behl, Tenth Edition, McGraw Hill education.

Kenneth C. Laudon, Jane P. Laudon, "**Management Information System, Managing the Digital Firm**", Ninth Edition, Pearson Education

**References**

Management information systems, Waman S Jawadekar, fourth edition, Tata McGraw Hill

Information technology for management, Ramesh Behl, Tata McGraw Hill

# IT 227: Object Oriented Analysis and Design

*Credits: 3*

*Lecture Hours: 48*

## **Course Objective**

The main objective of this course is to acquaint students about technical approach for analyzing, designing and application, system, or business by applying the object oriented paradigm and visual modeling throughout development life cycles to foster better stakeholder communication and product quality.

## **Course Description**

This course contains introduction to object oriented analysis and design, elaboration, System sequence diagrams, GRASP, UML state diagrams and modeling.

## **Course Details**

### **Unit 1: Introduction**

**LH 9**

Introduction to OOAD – concept of OOAD? – Concept of UML, What are the United process(UP) phases – Inception – Use case Modeling – Relating Use cases – include, extend and generalization

### **Unit 2: Elaboration**

**LH 10**

Concept, Domain Models – Finding conceptual classes and description classes – Associations – Attributes – Domain model refinement – Finding conceptual class hierarchies – Aggregation and Composition – UML activity diagrams and modeling

### **Unit 3: System Sequence Diagrams**

**LH 10**

Concept, Relationship between sequence diagrams and use cases Logical architecture and UML package diagram – Logical architecture refinement – UML class diagrams – UML interaction diagrams

### **Unit 4: GRASP**

**LH 10**

Concept, Designing objects with responsibilities – Creator – Information expert – Low Coupling – Controller – High Cohesion – Designing for visibility – Applying GoF design patterns – adapter, singleton, factory and observer patterns

### **Unit 5: UML State Diagrams and Modeling**

**LH 9**

Concept – Operation contracts – Mapping design to code – UML deployment and component diagrams

## **Text Books**

Craig Larman, "*Applying UML and Patterns: An Introduction to Object – Oriented Analysis and Design and Iterative Development*", Third Edition, Pearson Education, 2005

## **References**

Mike O' Docherty, "*Object – Oriented Analysis & Design: Understanding System Development with UML 2.0*", John Wiley & Sons, 2005.2. James W-Cooper, Addison-Wesley, "*Java Design Patterns – A Tutorial*", 2000.

Micheal Blaha, James Rumbaugh, "*Object-Oriented Modeling and Design with UML*", Second Edition, Prentice Hall of India Private Limited, 2007.

Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides, "*Design Patterns: Elements of Reusable Object-Oriented Software*", Addison-Wesley, 1995

# IT 228: Artificial Intelligence

*Credits: 3*  
*Lecture Hours: 48*

## Course Objectives

This module aims to provide the students with the basic foundation on concepts of searching and knowledge representation in AI systems. The key objective is to make students more pragmatic in knowledge of AI by giving its applications like designing and training Artificial Neural Networks along with additional laboratory works.

## Course Description

Introduction, Agents and Environments, Informed and Uninformed Search, Knowledge Representation, Learning, Applications of AI, Production Systems, Uncertainty in AI.

## Course Details

### Unit 1: Introduction

**LH 4**

- 1.1 What is AI?
  - 1.1.1 Turing test approach: Chinese room argument
  - 1.1.2 Cognitive approach
  - 1.1.3 Laws of thought approach
  - 1.1.4 Rational agent approach
- 1.2 Difference between AI and Omniscience

### Unit 2: Agents and Environments

**LH 7**

- 2.1 Agent, Rational agent, and Intelligent Agent
- 2.2 Relationship between agents and environments
- 2.3 Environments and its properties
- 2.4 Agent structures
  - 2.4.1 Simple reflex agents
  - 2.4.2 Model-based reflex agents
  - 2.4.3 Goal-based agents
  - 2.4.4 Utility-based agents
  - 2.4.5 Learning agents
- 2.5 Performance evaluation of agents: PEAS description

### Unit 3: Informed and Uninformed Search

**LH 8**

- 3.1 Why search in AI?
- 3.2 Blind search (Un-informed search)
  - 3.2.1 Breadth first search (BFS)
    - Variations:**Uniform cost search
  - 3.2.2 Depth first search (DFS)

**Variations:**Depth limited search, Iterative deepening DFS

- 3.3 Heuristic search (Informed search)
  - 3.3.1 Hill climbing
    - 3.3.1.1 The Foothills Problem
    - 3.3.1.2 The Plateau Problem
    - 3.3.1.3 The Ridge Problem
  - 3.3.2 Greedy (Best-first) search
  - 3.3.3 A\* algorithm (search)
  - 3.3.4 Means-Ends Analysis: Household ROBOT, Monkey Banana Problem
- 3.4 General Problem Solving (GPS): Problem solving agents
  - 3.4.1 Constraint satisfaction problem
    - 3.4.1.1 Constraint Satisfaction Search
    - 3.4.1.2 AND/OR trees
    - 3.4.1.3 The bidirectional search
    - 3.4.1.4 Cryptoarithmic
- 3.5 Game playing and AI
  - 3.2.1 Game Trees and Minimax Evaluation
  - 3.2.2 Heuristic Evaluation
  - 3.2.3 Min-max algorithm (search)
  - 3.2.4 Min-max with alpha-beta
  - 3.2.5 Games of chance
  - 3.2.6 Game theory

#### **Unit 4: Knowledge Representation**

**LH 8**

- 4.1 Logic
  - 4.1.1 Propositional Logic
    - 4.1.1.1. Syntax, semantics, and properties
    - 4.1.1.2. Conjunctive Normal Form (CNF)
    - 4.1.1.3. Disjunctive Normal Form (DNF)
    - 4.1.1.4. Inference Rules
    - 4.1.1.5. Resolution
  - 4.1.2 Prehdicate Logic
    - 4.1.1.1. First-Order Predicate Logic (FOPL)
    - 4.1.1.2. Syntax and semantics in FOPL
    - 4.1.1.3. Quantifiers
    - 4.1.1.4. Clausal Normal Form
    - 4.1.1.5. Resolution
  - 4.1.3 Fuzzy Logics
- 4.2 Semantic networks (nets): Introduction, and examples

#### **Unit 5: Learning**

**LH 6**

- 5.1 Why learning?
- 5.2 Supervised (Error based) learning

- 5.2.1 Gradient descent learning: Least Mean Square, Back Propagation algorithm
- 5.2.2 Stochastic learning
- 5.3 Unsupervised learning
  - 5.3.1 Hebbian learning algorithm
  - 5.3.2 Competitive learning
- 5.4 Reinforced learning (output based)
- 5.5 Genetic algorithms: operators

## **Unit 6: Applications of AI**

**LH 5**

- 6.1 Artificial Neural Networks (ANN)
  - 6.1.1 Neural Networks (NN) and ANN
  - 6.1.2 Activation functions: unit (unary and binary), ramp, piecewise linear, & sigmoid
  - 6.1.3 Training and testing: Basic concept
  - 6.1.4 Mc-Colloch-Pits neuron model
    - 6.1.5.1. Realization of AND, OR, NOT, and XOR gates
  - 6.1.5 Neural network architectures
    - 6.1.6.1. Single layer feed-forward architecture: ADALINE, Perceptron NN
  - 6.1.6 Applications of ANN
- 6.2 Natural Language Processing (NLP)
  - 6.2.1 Fundamentals of language processing

## **Unit 7: Production systems**

**LH 4**

- 7.1 Strong Methods vs Weak Methods
- 7.2 Advantages of Production Systems
- 7.3 Production Systems and inference methods
  - 7.3.1 Conflict resolution strategies
  - 7.3.2 Forward chaining
  - 7.3.3 Backward chaining

## **Unit 8: Uncertainty in AI**

**LH 3**

- 8.1 Fuzzy sets
- 8.2 Fuzzy logic
- 8.3 Fuzzy inferences
- 8.4 Probability theory and uncertainty

## **Unit 9: Expert Systems Human and Machine experts**

**LH 3**

- 9.1 Characteristics of expert systems
- 9.2 Knowledge engineering
- 9.3 Knowledge acquisition
- 9.4 Classic expert system
  - 9.4.1 DENDRAL
  - 9.4.2 MYCIN
  - 9.4.3 EMYCIN
- 9.5. Case based reasoning

### **Lab Task:**

Students are required to carry out at least 6 lab tasks on predicate calculus, searching and neural networks using **ProLog** and C/C++/Java. Some of the lab tasks may be on:

- 1 Relationship programs (e.g. mother, father, brother etc)
- 2 Recursive programs: Factorial, Fibonacci series etc
- 3 Ancestor programs
- 4 Tower of Hanoi (TOH) program
- 5 Monkey banana problem
- 6 Realization of logic gates (using C/C++/Java)

### **References**

Russel S. and Norvig P., *Artificial Intelligence: A modern Approach*, Prentice hall

Ritch and Knight, *Artificial Intelligence*, Prentice hall

Dan W. Patterson, *Artificial Intelligence*

Artificial Intelligence in the 21<sup>st</sup> century, Stephen Lucci, Danny Kopec, Mercury Learning and Information

Artificial Intelligence: **Foundations of computational Agents**, David L. Poole, Alan K. Mackworth, first edition, Cambridge University Press

Tribhuvan University  
**Faculty of Management**  
**Office of the Dean**



**Course detail of  
BIM (Bachelor of Information Management) 8<sup>th</sup> Semester**

IT 229: IT Entrepreneurship and Supply Chain Management	3 Cr. hrs
IT 230: Economics of Information and Communication	3 Cr. hrs
Two Elective Courses	6 Cr. hrs
IT 350: Internship	3 Cr. hrs

2017

# IT 229: IT Entrepreneurship and Supply Chain Management

*Credits: 3*

*Lecture Hours: 48*

## **Course Objectives**

This module aims to impart entrepreneurial skill in student to effectively run business and efficiently manage the supply chain. Students are required to undertake project work in this module.

## **Course Description**

Overview of Entrepreneurship, Business Plan for a new venture-introduction, Overview of Supply Chain Management, Co-ordination in a Supply Chain, Supply Chain performance: Achieving Strategic fit and scope, Supply chain Drivers and Matrices, Designing the supply chain Network, IT in a Supply Chain, Planning demand and supply in supply chain. Supply Chain Globalization, Entrepreneurial Supply Chain.

## **Course Details**

### **Unit 1: Overview of Entrepreneurship**

**LH 4**

- Entrepreneurship
- Definition of Entrepreneur
- The entrepreneurial decision process
- Role of entrepreneurship In economic development
- Intrapreneurship
- Ethics and social responsibility of Entrepreneurship

### **Unit 2: Business Plan for a new venture-introduction**

**LH 6**

- Defining the Business plan
- Scope and value of the Business plan
- Writing the Business plan
- The Marketing plan
  - Marketing research for a new venture
  - Characteristics of a Marketing plan
  - Steps in preparing a marketing plan

### **Unit 3: Overview of Supply Chain Management**

**LH 6**

- Definition of Supply Chain Management
- Functions and Objective of a Supply Chain
- Decision phases of Supply Chain
- Process View of a Supply Chain - Cycle View and Pull/Push View
- The importance of a supply chain flows
- Pitfalls and opportunities in a Supply Chain
- Case Studies presentations**
  - Dell Computer: Direct Marketing

7-Eleven: A convenience Store  
Toyota: A Global Auto Manufacturer  
Amazon.com: An e-Business Summary

**Unit 4: Co-ordination in a Supply Chain**

**LH 6**

Lack of Supply Chain co-ordination and the Bullwhip effect  
Effect of lack of co-ordination on performance  
Obstacles to co-ordination in a Supply chain  
Managerial Levers to achieve coordination.  
Role of IT in coordination, forecasting and Replenishment

**Unit 5: Supply Chain performance: Achieving Strategic fit and scope**

**LH 5**

Competitive and Supply Chain Strategies Achieving Strategic fit  
Understanding the customer  
Understanding the supply chain  
Achieving strategic fit  
Obstacles in achieving strategic fit

**Unit 6: Supply chain Drivers and Matrices**

**LH 4**

Drivers of supply Chain performance  
Frame work for structuring Drivers.  
Role of each cross functional drivers in competitive strategy and supply chain strategy with components  
Facility  
Inventory  
Information  
Transportation  
Sourcing  
Pricing

**Presentations**

Role of MIS,ERP,ESS,EIS,AI ,DSS in cross functional drivers performance.

**Unit 7: Designing the supply chain Network**

**LH 6**

Role of distribution in supply chain  
Factors influencing distribution network design  
Design Option for a distribution Network  
E-business and the Distribution Network.  
Role of network design in supply chain.  
Factors influencing Network Design Decisions  
Frame work for Network design Decision

Network optimization Models  
The capacitated plant location model  
Gravity Location model

**Unit 8: IT in a Supply Chain**

**LH 3**

The role of IT in a Supply Chain and its network design  
Supply chain IT Framework  
Supply chain Macro process and IT  
Future of IT in supply chain  
Risk Management in IT  
Supply chain IT in Practice

**Unit 9: Planning demand and supply in supply chain**

**LH 3**

Characteristic and role of forecasting  
Role of IT in forecasting  
Role of aggregate planning with problems in supply chain  
Role of IT in aggregate Planning  
Inventory Planning with known and uncertain demand

**Unit 10: Supply Chain Globalization**

**LH 3**

Rational and key strategies  
Requirements and Challenges  
Supply Chain Globalization  
Potential hidden costs  
Total Cost Strategy

**Unit 11: Entrepreneurial Supply Chain**

**LH 2**

Introduction  
Strategies

**Tutorial**

**LH 12**

**References**

Supply chain Management, Strategy, Planning, and Operation By Sunil Chopra, Peter Meindl (Third Edition)  
Entrepreneurship (Fifth Edition) By Robert D. Hisrich and Michael P. Peters  
Management information system (Managing the digital firm) by Kenneth C. Laudon and Jane P. Laudon (Ninth edition)  
Management Information system by James O' Brien (sixth edition)

# IT 230: Economics of Information and Communications

*Credits: 3*  
*Lecture Hours: 48*

## Course Objective

This module aims to examine information as an economic commodity and a public good especially in relation to pricing, provision and regulation.

## Course Description

Managerial Economics Basic, Markets for Information Goods, The Role of Information in an Economy, Strategies for Pricing Information, Rights Management, Market Strategies: Switching costs and Lock-in, Networks and Positive Feedback, Strategies for Information Industries, Antitrust and Information Policy, Thriving in a new economy, The knowledge-based new Economy, Information and communication Technologies in the Hollywood's global Primacy

## Course Details

### Unit 1: Managerial Economics Basic

**LH 3**

- 1.1 Defining moments of economics: from Industrial revolution to Information revolution
- 1.2 Technological change in a global economy
- 1.3 Market failure, Externalities and Public goods

### Unit 2: Markets for Information Goods

**LH 4**

- 1.4 Foundations of the Information economy
- 1.5 Introduction to Information economy
  - 1.5.1 Definition of information good
  - 1.5.2 The cost of producing information
  - 1.5.3 Managing intellectual property
  - 1.5.4 Economic and public good
  - 1.5.5 The economics of attention
- 1.6 Technology
  - 1.6.1 Systems competition
  - 1.6.2 Lock-in and switching costs
  - 1.6.3 Positive feedback, network externalities, and standards
- 1.7 Policy

### Unit 3: The Role of Information in an Economy

**LH 4**

- 1.8 Transaction costs and Information costs
- 1.9 The economy of search
- 1.10** Information problems
  - 1.10.1 The moral hazard problem
  - 1.10.2 The Adverse-Selection Problem
- 1.11 Speculation and Risk Bearing

1.12 The Futures Market

**Unit 4: Strategies for Pricing Information**

**LH 6**

1.13 Pricing Information Goods

1.13.1 Cost of producing information

1.13.2 Costs and competition

1.13.3 Product Personalization

1.13.4 Product pricing

1.13.5 Personalized pricing

1.13.6 Versioning

1.13.7 Group pricing- Price sensitivity, Network effects, Lock-in, Sharing

1.14 Versioning Information

1.14.1 Types of versioning

1.14.2 Value-subtracted versions

1.14.3 Avoiding pitfalls in versioning

1.14.4 On-line and off-line versions

1.14.5 Goldilocks pricing

1.14.6 Customizing the browser

1.14.7 Bundling

1.14.8 Promotional pricing

**Unit 5: Rights Management**

**LH 3**

1.15 Production and distribution costs

1.16 Lower distribution costs

1.17 Lower reproduction costs

1.18 Trusted systems

1.19 Historical examples - Growing the market

1.20 Choosing terms and conditions

**Unit 6: Market Strategies: Switching costs and Lock-in**

**LH 5**

1.21 Recognizing Lock-In

1.21.1 Examples of lock-in

1.21.2 Valuing an installed base of customers

1.21.3 Classification of lock-in

1.21.4 Suppliers and partners face lock-in, too

1.21.5 The lock-in cycle

1.22 Managing Lock-In

1.22.1 Lock-in strategy for buyers

1.22.2 Lock-in strategy for sellers

1.22.3 Investing in an installed base

1.22.4 Encouraging customer entrenchment

1.22.5 Leveraging your installed base

**Unit 7: Networks and Positive Feedback**

**LH 7**

1.23 Positive feedback

1.24 Demand-side economies of scale

- 1.25 Network externalities
- 1.26 Collective Switching Costs
- 1.27 Igniting positive feedback: performance vs. compatibility
- 1.28 Revolution: offer compelling performance
- 1.29 Igniting positive feedback: openness vs. control
- 1.30 Generic strategies in network markets
- 1.31 Historical examples of positive feedback- Telephone networks and interconnection

#### **Unit 8: Strategies for Information Industries**

**LH 4**

- 1.32 Cooperation and Compatibility
  - 1.32.1 How standards change the game
  - 1.32.2 Winners and Loser from standards
  - 1.32.3 Tactics in formal standard-setting
  - 1.32.4 Managing open standards
    - 1.32.4.1 Case Study- Linux Adoption in the Public Sector: An Economic Analysis
- 1.33 Waging a Standards War
  - 1.33.1 Classification of standards wars
  - 1.33.2 Information-age standards wars
  - 1.33.3 Key assets in network markets
  - 1.33.4 Two basic tactics in standards wars
  - 1.33.5 Capstone case: Microsoft vs. Netscape,

#### **Unit 9: Antitrust and Information Policy**

**LH 2**

- 1.34 Policy overview
- 1.35 Price differentiation
- 1.36 Competition policy
- 1.37 Telecommunications regulation and policy in brief (Nepalese context)

#### **Unit 10: Thriving in a new economy**

**LH 2**

- 1.38 The components of Digital Economics
- 1.39 Twelve theme of the new economy
- 1.40 The ten technology shift
- 1.41 The Internet Economy and its Indicators
- 1.42 E-commerce and Digital Economy

#### **Unit 11: Information and communication Technologies in the Hollywood's global Primacy** **LH 3**

- Hollywood, defined, Hollywood's economic leadership, Economic analysis of the Hollywood system
- Drivers of Hollywood's competitive Advantage
- The economic drivers of Hollywood's global
  - Competitive advantage
  - Factor conditions
  - Relating and supporting industries
  - Strategy, structure and rivalry
  - Demand conditions
  - The potential threats to Hollywood's global primacy in an evolving landscape

**Unit 12: The effects of continual disruption: technological resources supporting resilience in regions of conflict** **LH 2**

- Technologies to aid resilient behavior
- Research setting
- Technologies resources supporting resilience

Information systems in crisis

- Introduction
- Exploring key information resources
- Fundamental components of an information environment

**References**

Robert S. Pindyck and Daniel S. Rubinfeld. *Microeconomics*, 5<sup>th</sup> Edition, PHI.(ISBN: 81-203-2336-X )

H. Craig Petersen and W. Cris Lewsi. *Managerial economics*. (ISBN: 81-203-0963-4)

Carl Shapiro and Hal R. Varian. *Information Rules: A Strategic Guide for the Network Economy*. Harvard Business School Press, Cambridge, MA, 1998.

Roy J. Ruffin and Paul R. Gregory: *Principles of economics*. 7<sup>th</sup> edition, Addison Wiley Pub, 2000.

Don Tapscott. *The digital economy: Promise and peril in the age of networked intelligence*. McGraw-Hill. (ISBN : 0-07-063342-8)

Amrit Tiwana. *The knowledge Management Toolkit: Practical techniques for building a knowledge Management System*. Pearson Education . (ISBN 981-405-873-4)

Efraim Turban, Jae Lee, David King, H. Michael Chung. *Electronic Commerce- A managerial Perspective*. Pearson Education. (ISBN: 81-7808-362-0)

Niraj K Gupta. *The Business of telecommunication- Networking in the New Millennium*. Tata McGraw-Hill. (ISBN: 0-07-463497-6)

Pete Moulton. *The telecommunications survival guide*. Pearson Education. (ISBN: 81-7808-302-7)

*Information Technology for development. IT Policy and Strategy papers for Nepal*. HMG of Nepal, NPC Secretariat, Kathmandu, Nepal.

An Introduction to the Economics of Information 2nd Edition Oxford –Ines Macho-Stadler and J.David Tiz Castrillo

# IT 305: Object Oriented Database Management System

(Elective )

*Credits: 3*

*Lecture Hours: 48*

## Course Objective

This module aims to provide the students the knowledge of Object Oriented Database Management System.

## Course Description

Introduction, Object Orientated DBMS, Semantic Database Models & Systems, Object Oriented Database Systems, OODBMS Architecture – An Introduction, Introducing object oriented programming, Objects in the Database, Large Objects

## Course Details

### Unit 1: Introduction

**LH 4**

- A major Change: The relational Data Model
- Object Roles in Databases
- Sample uses of Object-oriented Databases
- Benefits of Object Orientation

### Unit 2: Object Orientated DBMS

**LH 8**

- The Object-oriented Data Model
  - Object-Oriented Data Relationships
  - Object Identifiers
  - One-to-Many relationships
  - Many-to-Many relationships
  - The IS-A relationship
  - The Extends relationship
  - The Whole-Part relationship
- Relationship Integrity
- ER Diagramming Models for Object-Oriented Relationships
  - Booch Notation
  - Unified Modeling Language
- Integrating Objects into a Relational Database
- The Extended Relational Model Approach
- The Semantic Database Approach
- The Proposed Object Database Standard
  - Basic OODBMS Terminology
  - Understanding Types
  - External specifiers
  - Implementations
  - Primitive Types
  - Inheritance
  - Interfaces and Inheritance
  - Classes and Extensions
- Objects
  - Collection Objects
  - Structured Objects
  - Creating and Destroying Objects
- Representing Logical Relationships

### Unit 3: Semantic Database Models & Systems

**LH 3**

- The Entity relationship Model
- Relational Model – Tasmania (RMT)

<b>Unit 4: Object Oriented Database Systems</b>	<b>LH 3</b>
➤ Performance Issues in OODBMS	
➤ Application Selection for OODBMS	
➤ The Object Oriented Database Paradigm Manifesto	
➤ The Mandatory Features	
➤ The Optional Features	
<b>Unit 5: OODBMS Architecture – An Introduction</b>	<b>LH 2</b>
➤ An overview	
<b>Unit 6: Introducing object oriented programming</b>	<b>LH 10</b>
Data and Procedural Abstraction	
Object Type Overview	
Creating Object Types	
Object type specification: attributes, methods	
Declaring and initializing objects	
SELF parameter	
MAP and ORDER Methods	
Object type inheritance	
<b>Unit 7: Objects in the Database</b>	<b>LH 10</b>
Introduction to objects in the database	
Object Tables: creating Object tables, Inheritance and attribute chaining	
Object views	
Creating Basic Object views	
Accessing Column Objects	
DEREF	
IS DANDLING	
TREAT	
VALUE	
SYS_TYPEID	
UTL_REF	
<b>Unit 8: Large Objects</b>	<b>LH 8</b>
Introduction to Large Objects	
Features Comparison	
Types of LOBS, LOB Locators	
Internal LOBs: BLOB, CLOB, NCLOB	
External LOBS: BFILE	
VARRAY	

**Text Books**

- *Harrington J.L, (2000) “Object-Oriented Database Design, Clearly Explained”, Morgan Kaufmann.*
- *Scott Urman, Ron Hardman, Micheal McLaughlin, Oracle Database 10g PL/SQL Programming, Tata McGraw Hill*
- *Prabhu C.S.R, (2003), “Object-Oriented Database Systems”, Prentice Hall India*

**References:**

- *Feuerstein S., Pribyl B., Oracle PL/SQL Programming, O’Reilly*
- *McLaughlin M., (2008), Oracle Database 11g PL/SQL Programming, Oracle Press*

# IT 306: Software Project Management

(Elective)

*Credits: 3*

*Lecture Hours: 48*

## Course Objectives

The module aims to provide an overview of the roles, responsibilities and management methods of the software project manager. The course intended to teach students how to develop approaches and styles of management for software projects.

## Course Description

Software Project Basics, Tools and Techniques, Estimation, Project Schedules, Reviews, Software requirements, Design and Programming, Software Testing, Using Project management effectively, Management and leadership, Managing an outsourced Project, Process Improvement

## Course Details

### Unit 1: Software Project Basics

**LH 5**

Introduction

Types of Software Projects

Classification of software projects: Based on software development life cycle, approach driven, maintenance, web application, agile development

Approaches to software project management

Alignment of software engineering methodology with project: management methodology

The Ad Hoc Methods-based Approach

The process-Driven Approach

Comparison between Ad Hoc Approach with the process-driven approach

Software Project Acquisition

Writing proposal, negotiating, contract acceptance

### Unit 2: Tools and Techniques

**LH 4**

Software project planning

Understanding the why is project needed and needs of project

Project management plan: resources, skill sets, computer systems

Risk assessment and management plan

Create the project plan

### Unit 3: Estimation

**LH 4**

Elements of successful estimate

Wideband Delphi Estimation

Other Estimation Techniques

Evaluation Estimation Problems

### Unit 4: Project Schedules

**LH 5**

Building the project schedule

The Work breakdown structure

Graphic representation of a schedule

Managing multiple projects

Schedule to manage commitments

Evaluation scheduling problems

<b>Unit 5: Reviews</b>	<b>LH 4</b>
Inspections	
Deskchecks	
Walkthroughs	
Code reviews	
Pair Programming	
Inspect to manage commitments	
<b>Unit 6: Software requirements</b>	<b>LH 5</b>
Requirement elicitations	
Use Cases	
Software requirement specification	
Change control	
<b>Unit 7: Design and Programming</b>	<b>LH 4</b>
Review the design	
Version control with subversion	
Refactoring	
Unit Testing	
Use automation	
<b>Unit 8: Software Testing</b>	<b>LH 4</b>
Test plans and cases	
Test execution	
<b>Unit 9: Using Project management effectively</b>	<b>LH 4</b>
Understanding change, making change successful	
<b>Unit 10 Management and leadership</b>	<b>LH 3</b>
Take responsibility	
Doing everything out in open	
Manage the organization	
Manage the team	
<b>Unit 11: Managing an outsourced Project</b>	<b>LH 3</b>
Prevent major sources of project failure	
Management issues in outsourced projects	
Collaborate with the Vendor	
<b>Unit 12: Process Improvement</b>	<b>LH 3</b>
Software process improvement	
Moving forward	

#### References

AdnerwStellman, Jennifer Greene, “Applied Software Project management”, First edition, O’Reilly Meida

Murali K. Chemuturi, Thomas M. CagelyJr, “Mastering software project management” ,J. Ross Publishing

Highes, B. and Cotterell, M., “Software Project Management”. McGraw Hill, 1999.

Conway, K., “Software Project Management”, -From Concept to Deployment”, DreamTech Press, 2001

Garmus, D. and Herron, D., “Function Point Analysis, Measurement Practices for Successful Software Projects”, Addison-Wesley, 2001.

# IT 308: Data Mining and Data Warehousing

(Elective)

*Credits: 3*

*Lecture Hours: 48*

## Course Objective

The objective of the course is to make learner understand foundation principles and techniques of data mining and data warehousing. Students will be able to select and use various data mining language and tools very useful for adding business value of an organization.

## Course Description

Introduction, Data Preprocessing- Data Integration and Transformation, Classification, Association Analysis, Cluster Analysis, Information Privacy and Data Mining, Advanced Applications, Search engines, Data Warehouses, Capacity Planning.

## Course Details

### Unit 1: Introduction

**LH 2**

- 1.1. Data Mining Origin
- 1.2. Data Mining & Data Warehousing basics

### Unit 2: Data Preprocessing

**LH 6**

- 2.1. Data Types and Attributes
- 2.2. Data Pre-processing
- 2.3. OLAP
- 2.4 Characteristics of OLAP Systems
- 2.5 Multidimensional View and Data cube
- 2.6 Data Cube Implementation
- 2.7 Data Cube Operations
- 2.8 Guidelines for OLAP Implementation

### Unit 3: Classification

**LH 7**

- 3.1. Basics and Algorithms
- 3.2. Decision Tree Classifier
- 3.3. Rule Based Classifier
- 3.4. Nearest Neighbor Classifier
- 3.5. Bayesian Classifier
- 3.6. Artificial Neural Network Classifier
- 3.7. Issues : Overfitting, Validation, Model Comparison

### Unit 4: Association Analysis

**LH 7**

- 4.1. Basics and Algorithms
- 4.2. Frequent Itemset Pattern & *Apriori* Principle
- 4.3. FP-Growth, FP-Tree
- 4.4. Handling Categorical Attributes

<b>Unit 5: Cluster Analysis</b>	<b>LH 7</b>
5.1. Basics and Algorithms	
5.2. K-means Clustering	
5.3. Hierarchical Clustering	
5.4. DBSCAN Clustering	
<b>Unit 6: Information Privacy and Data Mining</b>	<b>LH 3</b>
6.1 Basic principles to Protect Information Privacy	
6.2 Uses and Misuses of Data Mining	
6.3 Primary Aims of data Mining	
6.4 Pitfalls of Data Mining	
<b>Unit 7: Advanced Applications</b>	<b>LH 3</b>
7.1. Web-mining: Web content mining, web usage mining	
7.2. Time-series data mining	
<b>Unit 8: Search Engines</b>	<b>LH 3</b>
8.1 Characteristics of search engine	
8.2 Search Engine functionality	
8.3 Ranking of Web pages	
<b>Unit 9: Data Warehousing</b>	<b>LH 7</b>
9.1 Operational Data sources	
9.2 ETL (Extract, Transform, Load)	
9.3 Data Warehouse Processes, Managers and their functions	
9.4 Data Warehouses and Data Warehouses Design	
9.5 Guidelines for Data Warehouse Implementation	
<b>Unit 10 Capacity Planning</b>	<b>LH 3</b>
10.1 Calculating storage requirement, CPU requirements	

**Practical:**

Students should practice enough on real-world data intensive problems

**References:**

- Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Introduction to Data Mining, 2005, Addison-Wesley.
- Jiawei Han and Micheline Kamber, *Data Mining: Concepts and Techniques*, 2<sup>nd</sup> Edition, 2006, Morgan Kaufmann.
- G.K. Gupta, Introduction to Data Mining with Case Studies, Prentice Hall of India
- IBM, An Introduction to Building the Data Warehouse, Prentice Hall of India
- IBM, Introduction to Business Intelligence and Data Warehousing, Prentice Hall of India
- Adriaans Pieter, D. Zantige, "Data Mining", Pearson Education Asia Pub. Ltd, 2002

# IT 309: Client Server Computing

(Elective)

Credits: 3  
Lecture Hours: 48

## Course Objectives

This module aims to revisit and reinforce the knowledge in the networking system with special emphasis to Internet protocols, and client server based architecture. Laboratory work is essential in this course.

## Course Description

Introduction to Client / Server, Client / Server Components, Networking and Communication, Transport Layer Protocols, Introduction to Operating System, Understanding Middleware , Client Server Database, Socket Programming in Java ,Performance Tuning and Optimization, and Securing a Client / Server System, and Distributed System Architecture

## Course Details

### Unit 1: Introduction to Client / Server

LH 4

Introduction to Client / Server.

2-tier Architecture

3-tier Architecture

Benefits and Characteristics of Client / Server Architecture.

Client / Server Models

Distributed Presentation

Remote Presentation

Distributed Logic

Remote Data

Distributed Data.

Fat vs. Thin

### Unit 2: Client / Server Components

LH 3

Network Operating Systems for Client / Server.

Examples of NOS (Explanation not required)

Common Services of NOS.

### Unit 3: Networking and Communication

LH 4

Seven Layers Function of OSI Model

Cables(Structure, Application)

Guided(Twisted, Coaxial,Optical)

Unguided (Microwaves, Radiowaves, Bluetooth, Wimax)

Concepts of Logical and Physical Topologies.

Effect of Bandwidth on Client/Server.

#### **Unit 4: Transport Layer Protocols**

**LH 5**

- Introduction to UDP (User Datagram Protocol)
  - Operation of UDP
  - Characteristics of UDP
  - Application of UDP
- Introduction to TCP (Transmission Control Protocol)
  - Operation of TCP.
  - Characteristics of TCP
  - TCP three-way handshake process.
  - Application of TCP
- Relationship between TCP & IP
  - Standard TCP / IP services
  - Port numbers and socket address

#### **Unit 5: Understanding Middleware**

**LH 5**

- The Database Connectivity Challenge
  - Data Source Differences, Approaches to Database Connectivity
- Basic view of Middle Ware
  - General Characteristics
- Introduction to Groupware.
- The main types of Middleware,
  - DCE (Distributed Computing Environment)
    - Components
    - Application
  - MOM (Message Oriented Middleware)
    - Working Mechanism
    - Application
  - Transaction processing Monitors
    - Working Mechanism (ACID)
    - Application
  - ODBC (Open Database Connectivity) & JDBC(Java Database Connectivity)
    - Components
    - Features and Application.

#### **Unit 6: Client Server Database**

**LH 8**

- 1.1 Database System Architectures
- 1.2 Classic Client/Server Architecture
- 1.3 Setting ODBC/JDBC for connecting database in MSSQL Server, Oracle
- 1.4 Developing Three-Tier Client/Server Architecture
- 1.5 Open Database Connectivity

#### **Unit 7: Socket Programming in Java**

**LH 9**

- 1.6 Creating Client and Server Sockets (UDP and TCP sockets)
- 1.7 Reading from and writing to a Socket
- 1.8 Writing the Server Side of a Socket

## **Unit 8: Performance Tuning and Optimization**

**LH 4**

- Client Performance
  - Hardware and Software.
- Server Performance
  - Hardware and Software.
- Database Performance
  - Index design
  - Query design
  - Database design
- Network Performance
  - Data rate
  - Bandwidth
  - Throughput
  - Congestion

## **Unit 9: Securing a Client/Server System**

**LH 3**

- The Challenges of Client / Server Security
- Security for the Clients and Servers
  - Physical security
  - Software security
  - Network security

## **Unit 10: Distributed System Architecture**

**LH 3**

- Remote Procedure Call (RPC)
- Object Management Architecture (OMA)
- Distributed Resource Architecture
  - Distributed data Architecture
  - Distributed Server Architecture
  - Distributed Computing Architecture

**Project Work:** Instructor should assign project work to each group of student demonstrating distributed client server architecture overview using the following tools:

Back End : My SQL1 or oracle

Front End : VB.Net or Java

### **References**

- Alex Berson, Client / Sever Architecture
- Neil Jonkins et al, "Client/Server Unleashed"
- Jeffrey D. Schank, Client-Server Applications and Architecture
- Robert Orfail, Dan Harkey, Cliet/Server Programming with Java and CORBA, First Edition, Wiley

# IT 307: Operating Systems

(Elective )

*Credits: 3*  
*Lecture Hours:48*

## Course Objectives

This module aims to provide the concepts of Operating Systems and Implementation of Systems Utilities for Inter-process communication in a multiprocessor environment.

## Course Description

Overview, Process Management, Scheduling, Basic Synchronization principles, Memory Management, File Management, Protection and Security, Device Management

## Detailed Course

### Unit 1: Overview

**LH 5**

- 1.1 Introduction
- 1.2 System Structures
- 1.3 The abstract Model of computing
- 1.4 Resources: files
- 1.5 Processes: Creating Processes (using C functions: FORK, JOIN, and QUIT, )
- 1.6 Threads: C threads

### Unit 2: Process Management

**LH 8**

- 2.1 The system view of processes and resources
- 2.2 Initializing the Operating System
- 2.3 Process address spaces
  - 2.3.1 Creating the address space
  - 2.3.2 Loading the program
  - 2.3.3 Maintaining consistency in the address space
- 2.4 The process abstraction
  - 2.4.1 Process descriptors
  - 2.4.2 Process state diagram
- 2.5 The resource abstraction
- 2.6 Process hierarchy
  - 2.6.1 Refining the process manager
  - 2.6.2 Specializing resource allocation strategies

### Unit 3: Scheduling

**LH 9**

- 3.1 Scheduling Mechanisms
  - 3.1.1 The process scheduler organization
  - 3.1.2 Saving the process context
  - 3.1.3 Voluntary CPU Sharing
  - 3.1.4 Involuntary CPU Sharing
  - 3.1.5 Performance

- 3.3 Strategy Selection
  - 3.3.1 Partitioning s process into small processes
- 3.4 Nonpreemptive Strategies
  - 3.4.1 First come first served
  - 3.4.2 Shortest Job next
  - 3.4.3 Priority Scheduling
  - 3.4.4 Deadline scheduling
- 3.5 Preemptive strategies
  - 3.5.1 Round robin
  - 3.5.2 Multiple-level queues
  - 3.5.3 Monitors

#### **Unit 4: Basic Synchronization principles**

**LH 5**

- 4.1 Interacting processes
  - 4.1.1 Critical Sections
  - 4.1.2. Deadlock
- 4.2 Coordinating processes
- Semaphores
  - 4.2.1 Principles of operation
  - Practical considerations

#### **Unit 5: Memory Management**

**LH 8**

- 5.1 The Basics
  - 5.1.1 Requirements on the primary memory
  - 5.1.2 Mapping the address space to primary memory
  - 5.1.3 Dynamic memory for data structures
- 5.2 Memory Allocation
  - 5.2.1 Fixed-partition memory strategies
  - 5.2.2 Variable-partition memory strategies
  - 5.2.3 Contemporary Allocation Strategies
- 5.3 Dynamic Address Resolution
  - 5.3.1 Runtime bound Checking
- 5.4 Memory Manager Strategies
  - 5.4.1 Swapping
  - 5.4.2 Virtual Memory
  - 5.4.3 Shared-memory Multiprocessors

#### **Unit 6:File Management**

**LH 5**

- 6.1 File System
  - 6.1.1 File Concept
  - 6.1.2 Access Methods
  - 6.1.3 Directory Structure
  - 6.1.4 File System Mounting
  - 6.1.5 File Sharing
  - 6.1.6 Protection

- 6.2 Implementing File Systems
  - 6.2.1 File System Structure
  - 6.2.2 File System Implementation
  - 6.2.3 Directory Implementation
  - 6.2.4 Allocation Methods
  - 6.2.5 Free Space Management
- 6.3 Secondary Storage Structure
  - 6.3.1 Disk Structure
  - 6.3.2 Disk Scheduling
  - 6.3.3 Disk Management
  - 6.3.4 Swap Space Management
- 6.4 I/O Systems
  - 6.4.1 I/O Hardware
  - 6.4.2 Application I/O Interface

## **Unit 7: Protection and Security**

**LH 3**

- 7.1 Fundamentals
  - 7.1.1 Policy and Mechanism
  - 7.1.2 Implementing Policy and mechanism
  - 7.1.3 Authentication Mechanisms
  - 7.1.4 Authorization Mechanisms
  - 7.1.5 Encryption

## **Unit 8: Device Management**

**LH 5**

- 8.1 Device Management approaches
  - 8.1.1 I/O System Organization
  - 8.1.2 Direct I/O with Polling
  - 8.1.3 Interrupt-Driven I/O
  - 8.1.4 Memory-Mapped I/O
  - 8.1.5 Direct memory access
- 8.2 Device Drivers
  - 8.2.1 The device driver interface
  - 8.2.2 CPU-device interactions
  - 8.2.3 I/O optimization
- 8.3 Some Device Management Scenarios
  - 8.3.1 Serial Communications
  - 8.3.2 Sequentially accessed storage devices
  - 8.3.3 Randomly accessed devices

**Laboratory:**

- Students should implement operating system functionality in their project.

**Text Book:**

- Gary Nutt, Operating Systems A modern Perspective, Second edition, Pearson Education
- Silberschatz, A., Galvin, P. & Gagne, G., Operating System Principles, Seventh Edition, John Wiley & Sons

**References:**

- Andrew S. Tanenbaum, Modern Operating System, PHI
- Andrew S. Tanenbaum, Operating Systems Design and Implementation, Prentice Hall
- James L Peterson & Abraham Silberschatz, Operating System concepts, Addison Wesley
- Thomas W. Doeppner, Operating Systems in Depth, John Wiley & Sons